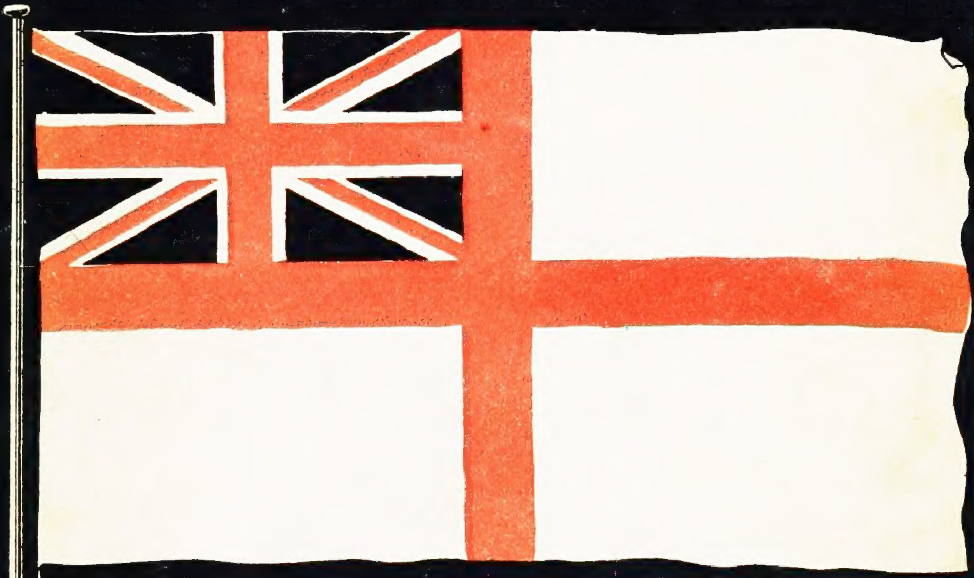
VA
454
E13
1904

THE BRITISH NAVY

PAST & PRESENT

BY_ REAR-ADMIRAL S. EARDLEY-WILMOT.



ILLUSTRATED

Published by
THE NAVY LEAGUE
13. VICTORIA STREET, WESTMINSTER, S.W.

1904

ONE SHILLING NETT

CO[illegible]TITUTION OF [illegible]UE.

1. This Association shall be called "THE NAVY LEAGUE." Its purpose shall be to secure as the primary object of the National Policy, "The Command of the Sea."

2. The general aims of THE NAVY LEAGUE shall be:

   (*a*) To spread information showing the vital importance to the British Empire of the Naval supremacy upon which depend its trade, empire, and national existence.

   (*b*) To call attention to the enormous demands which war would make upon the Navy, and to the fact that the Navy is not strong enough to meet them; and at all times to point out any shortcomings in this respect.

   (*c*) To call attention from time to time to such measures as may be requisite to secure adequate preparation for the maritime defence of the Empire.

   (*d*) To urge these matters on public men, and, in particular, upon candidates for Parliament.

3. The LEAGUE shall be absolutely distinct from all **party** politics.

Hon. Vice-President	£5	0	0	annually.
Do. for life	25	0	0	
Members (Ladies and Gentlemen)	1	1	0	annually.
Do. do. for life	10	10	0	
Associates, with publications post free, not less than	0	5	0	annually.
Do. without publications	any less amount.			

Subscriptions are renewable in that quarter of the following year corresponding to the one in which the first payment is made.

Cornell University Library
VA454 .E13 1904
The British navy, past and present,
3 1924 030 755 924
olin

THE BRITISH NAVY

PAST AND PRESENT

WITH LISTS SHOWING STRENGTH OF H.M. FLEET IN ALL CLASSES OF SHIPS

REVISED AND ENLARGED

BY

REAR-ADMIRAL S. EARDLEY-WILMOT

AUTHOR OF

"LIFE OF VICE-ADMIRAL LORD LYONS," "OUR NAVY FOR A THOUSAND YEARS," "OUR FLEET TO-DAY"

SECOND EDITION

ILLUSTRATED

London
THE NAVY LEAGUE, 13 VICTORIA STREET, S.W.
1904

THE NAVY LEAGUE.

A strictly non-party organisation to urge upon Government and the Electorate the paramount importance of an adequate Navy as the best guarantee of Peace.

President.

ROBERT A. YERBURGH, Esq., M.P.

Vice-Presidents.

Lord Aldenham.
The Right Hon. Lord Barrymore.
The Right Hon. Sir Robert Bond. (Premier of Newfoundland.)
The Earl Brownlow.
Vice-Admiral Claude E. Buckle.
Sir R. H. Williams Bulkeley, Bart.
Sir Henry C. Burdett, K.C.B.
The Earl of Carysfort.
General Lord Chelmsford, G.C.B., G.C.V.O.
The Clothworkers' Company.
The Rev. W. C. Compton, M.A. (Headmaster of Dover College.)
Admiral de Horsey.
The Earl of Denbigh.
The Earl of Drogheda.
The Earl of Dundonald, C.B., C.V.O.
Adml. Sir Arthur Farquhar, K.C.B.
The Rev. T. Field, D.D. (Warden of Radley College).
The Earl Fitzwilliam.
Lieut.-General G. W. Forbes, R.M.
The Rev. Lionel Ford, M.A. (Headmaster of Repton School.)
Adm. the Hon. Sir E. R. Fremantle, G.C.B., C.M.G.
General Sir W. A. Gib, K.C.B.
The Rev. H. B. Gray, D.D. (Warden of Bradfield College.)
W. H. Grenfell, Esq., D.L., M.P.
Rear-Admiral Hughes-Hallett.
The Duke of Hamilton.
Harold Harmsworth, Esq.
The Hon. Mr. Justice Harington.
J. K. J. Hichens, Esq.
Lieut.-General Sir James Hills-Johnes, G.C.B., V.C., R.A.
Lieut.-Col. Sir Albert Henry Hime, K.C.M.G. (Premier of Natal.)
Admiral Sir John Ommanney Hopkins, G.C.B.
Rear-Admiral Charles Johnstone.
Lord Kinnaird.
Rudyard Kipling, Esq.
The Marquess of Linlithgow, P.C., K.T., G.C.M.G., G.C.V.O.
Rear-Admiral Marcus Lowther.
The Earl of Malmesbury.
Adml. Sir F. Leopold McClintock, K.C.B.
C. Lowry, Esq., M.A. (Headmaster of Sedbergh School.)
C. McL. McHardy, Esq.
Sir Lewis McIver, Bart., M.P.
The Mercers' Company.
The Earl of Minto, G.C.M.G., P.C. (Governor-General of Canada.)
The Duke of Montrose, A.D.C., K.T.
Adml. Sir H. F. Nicholson, K.C.B.
Vice-Admiral Northland.
The Right Hon. Lord Plunket, C.V.O. (Governor of New Zealand.)
The Rev. B. Pollock, M.A. (Master of Wellington College.)
Sir Frederick Pollock, Bart., D.C.L.
Prof. G. W. Prothero, LL.D., Lit.D.
John Reid, Esq., of Elderslie, N.Z.
Lieut.-General Sir Richard H. Sankey, K.C.B.
Sir James Sawyer, M.D., F.R.C.P., F.R.S.E.
Miss Frances P. Seeley.
The Viscount Sidmouth.
The Rt. Hon. Sir J. Gordon Sprigg, K.C.M.G. (Premier of Cape Colony.)
The Rev. C. C. Tancock, D.D. (Headmaster of Tonbridge School.)
H. R. Thomson, Esq., M.A. (Headmaster of Eastbourne College.)
B. H. Tower, Esq., M.A. (Headmaster of Lancing College.)
The Rev. J. P. Way, D.D. (Headmaster of Rossall School.)
The Rt. Rev. Bishop Welldon, D.D. (Canon of Westminster.)
The Earl of Wilton.
The Earl of Winchilsea and Nottingham.
The Rev. J. Wood, D.D. (Headmaster of Harrow School.)

Hon. Treasurer.

H. SEYMOUR TROWER, Esq.

Hon. Secretaries.

Lieut. H. T. C. KNOX (late R.N.)
H. F. WYATT, Esq., B.A. (For Lectures.)

Secretary.

Comr. W. CAIUS CRUTCHLEY, R.N.R.

Head Office of the League.

13 VICTORIA STREET, WESTMINSTER, S.W.

Photo, Russell.

HIS MAJESTY KING EDWARD VII. EMPEROR OF INDIA,

Admiral of the Fleet.

Dedicated

TO

THE BOYS AND GIRLS

OF

THE BRITISH EMPIRE.

CONTENTS.

PAGE

I. OUR NAVY IN THE PAST 1

II. STEAM AND OUR EARLY IRONCLADS . . 15

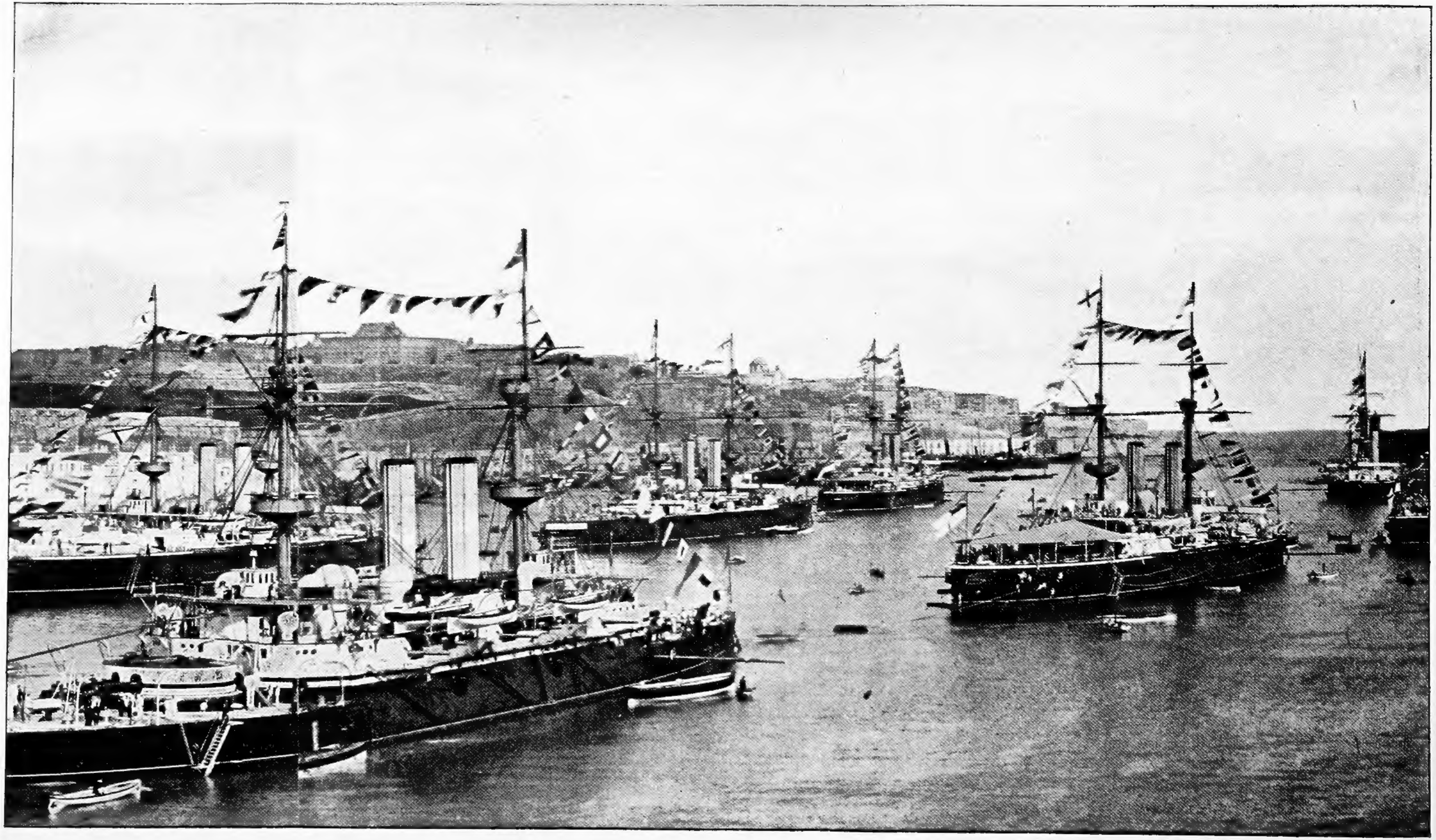
III. OUR PRESENT IRONCLAD FLEET . . 23

IV. CRUISERS AND TORPEDO CRAFT . . 43

V. MANNING 66

VI. ADMINISTRATION 80

APPENDIX 91



MALTA HARBOUR, WITH THE MEDITERRANEAN FLEET AT ANCHOR.

THE

BRITISH NAVY

PAST AND PRESENT.

I.

OUR NAVY IN THE PAST.

THE saying of Macaulay in the beginning of his History of England, that "nothing in the early existence of Britain indicated the greatness she was destined to attain," is specially applicable to the growth of our maritime power. Indeed it was not until after the defeat of the Spanish Armada that it became evident to Europe the small island state must henceforth be taken into consideration by reason of its aptitude for sea affairs. This is well put by Mr. J. R. Green, the historian. Writing of that event he says: "What Wolsey and Henry had struggled for Elizabeth had done. At her accession England was scarcely reckoned among European Powers. The wisest statesmen looked on her as doomed to fall into the hands of France, or to escape that fate by remaining a dependency of Spain. But the national independence had grown with the national life. She now stood on a footing of equality with the greatest Powers of the world. She had sprung at a bound into a Great Sea Power."

To realise this, it must be remembered that up to that time Spain and Portugal were the foremost maritime countries. The former had discovered America, and was deriving wealth from her Western possessions; while Portugal, impelled to exploration by sea owing to her geographical position, was establishing colonies in the East. Bartholomew Diaz had rounded the Cape of Good Hope in 1486, and in 1498 Vasco da Gama anchored in Indian waters. Such progress was made in those parts by the Portuguese that in 1505 Almeida was sent to India as Viceroy. Hence the surprise of Europe in 1588 that the mighty armament of Philip had been dispersed by a fleet which had hitherto gained renown chiefly by piratical expeditions. We had, however, in previous generations formed a hardy race of seamen whose success in many fights, and in raids across the Channel, made them well fitted to cope in their own waters with such an enemy. The birthplace of the English Navy was in that fishing industry carried on by the Cinque Ports flotilla which had guarded the Channel during many reigns. A spirit of adventure, and desire to obtain some of the wealth in distant parts of which they had heard wonderful accounts, had led the younger generation to take service with Frobisher, Hawkins and Drake; a service which turned out splendid seamen and enabled us later to compete with equal success against the Dutch. That nation now attained the chief place as a sea power, having defeated the fleets of Spain, and Holland eventually superseded Portugal in the Eastern possessions of that country. The decline of Portugal took place during her incorporation with Spain. England and Holland each formed a Company trading to the East at the beginning of the seventeenth century. Then the two countries came into rivalry, and various incidents, such as the massacre of the English at Amboyna, in the Moluccas, gradually led to hostilities. Hence arose the three Dutch wars which, beginning in the time of Cromwell continued during the reign of Charles II.

FRANCISCVS DRAECK NOBILISSIMVS EQVES ANGLIÆ AN° ÆT SVÆ 43

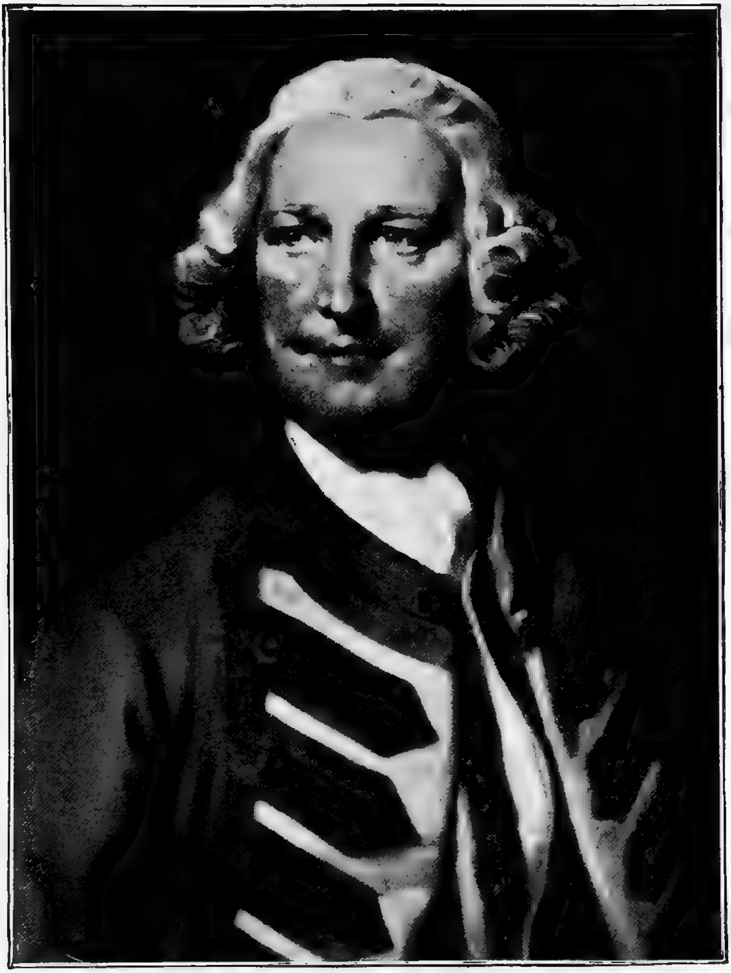
SIR FRANCIS DRAKE, 1540-1596.
(*After an old Dutch Print*).

LORD HAWKE, 1705-1781.

They were due to commercial jealousy and colonial rivalry, leading to a fierce struggle for naval supremacy. Success in the many actions at sea which took place between the fleets of the two countries alternated from one side to the other. The Dutch had more skilled seamen in De Ruyter and Tromp; while in men like Blake, Monk and Sandwich there was a doggedness in fighting which at close quarters counterbalanced their want of sea experience. In most of these actions there was little manœuvring, but both sides pounded away until by the number of ships disabled and men killed it was clearly seen on which side victory lay. When peace was made in 1672 we secured concessions which clearly indicated we had not been unsuccessful in disputing the dominion of the sea with our formidable rivals.

One characteristic of these actions was the use of fire-ships. The want of order in which ships navigated and fought gave opportunities for this weapon which were seen and utilised. Many ships were destroyed by this means. This no doubt largely tended to bring about keeping ships in line as far as possible, which line could be opened out on the approach of a fire-ship and the danger thus avoided. Vessels were increasing greatly in size, while the number of guns carried in first-rates was now 100, though individually they were of small size.

In the meantime France had been creating a navy which, given a good start by Richelieu, was neglected by Mazarin. The latter, however, was succeeded by Colbert, who, by his energy and ability, reorganised and augmented that force which he saw was so important for any country with an extensive sea-board. Hence, during a temporary alliance with England against the Dutch, France had been able to furnish a considerable force of ships to act with us, though they afforded little assistance on the day of battle. Louis XIV. was now at the zenith of his power, and it soon became



Anson

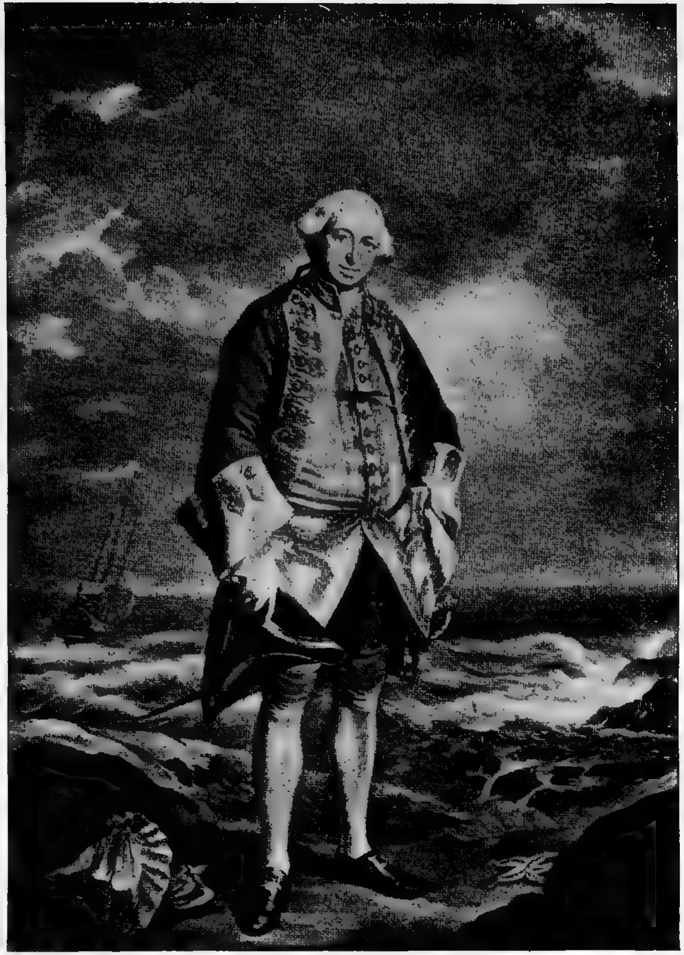
1697-1762.

By kind permission of Messrs. Murray.

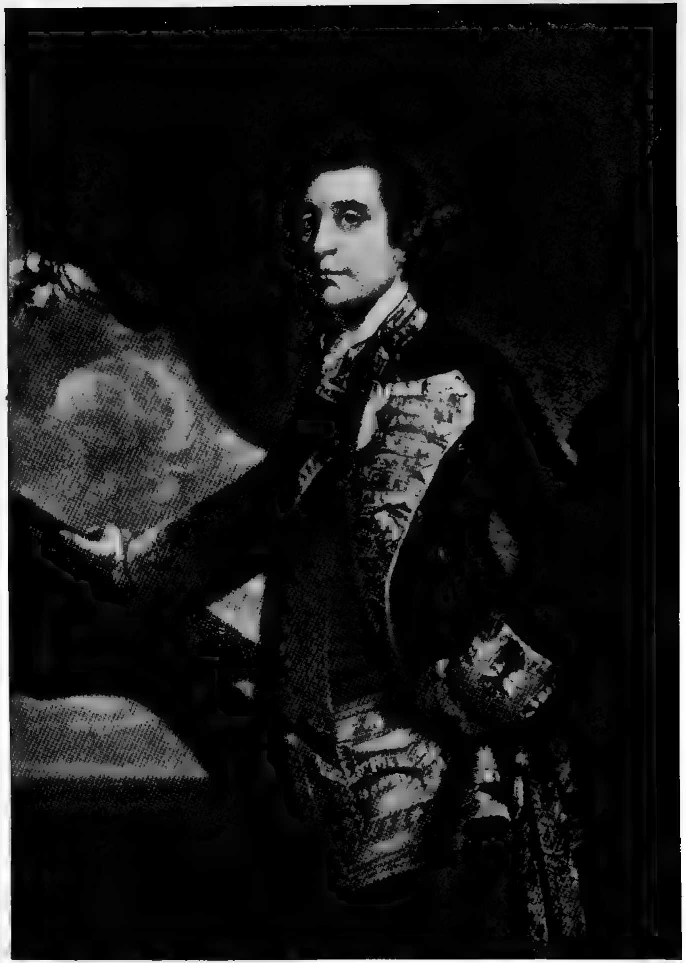
evident that a struggle must ensue between France and England.

The occasion came after the abdication of James II. and the accession of the Prince of Orange to the English throne. War against France was declared in 1689, and we were assisted by Holland. The French gained some success at first, but eventually their fleet suffered a great reverse off Cape La Hogue from a combined English and Dutch squadron. The war terminated in 1697, when peace was made. We had held our own, though the resources of France had created a marine of 100 sail. The Peace of Ryswick did not last long, for war broke out in 1702, and two years later we took Gibraltar. During the hostilities, which lasted till 1713, there were no great actions at sea, but we had inflicted considerable loss upon our enemies, who, during the latter part of the war, devoted their efforts chiefly to interrupt our commerce. It was nearly thirty years before the struggle was renewed, but in the meantime our fleet had been engaged in war with more than one other Power. France at last joined Spain against us, and the opposing fleets met in the Mediterranean, with very little credit to our own. At this period our Navy suffered from a want of co-operation among the senior officers—one admiral was jealous of another; captains were insubordinate and would not support or obey their commander-in-chief. It was not so much want of personal courage as an entire lack of discipline. Benbow had suffered from it in the West Indies, with the result that two or three of his captains were executed. Rodney experienced the same thing, and it was not till Lord St. Vincent clearly demonstrated to his captains that all officers must obey, that the profession was purged of this scandal, and Nelson was enabled to reap the benefit of it later on in the support of his captains.

The proof of our general want of success in this war was

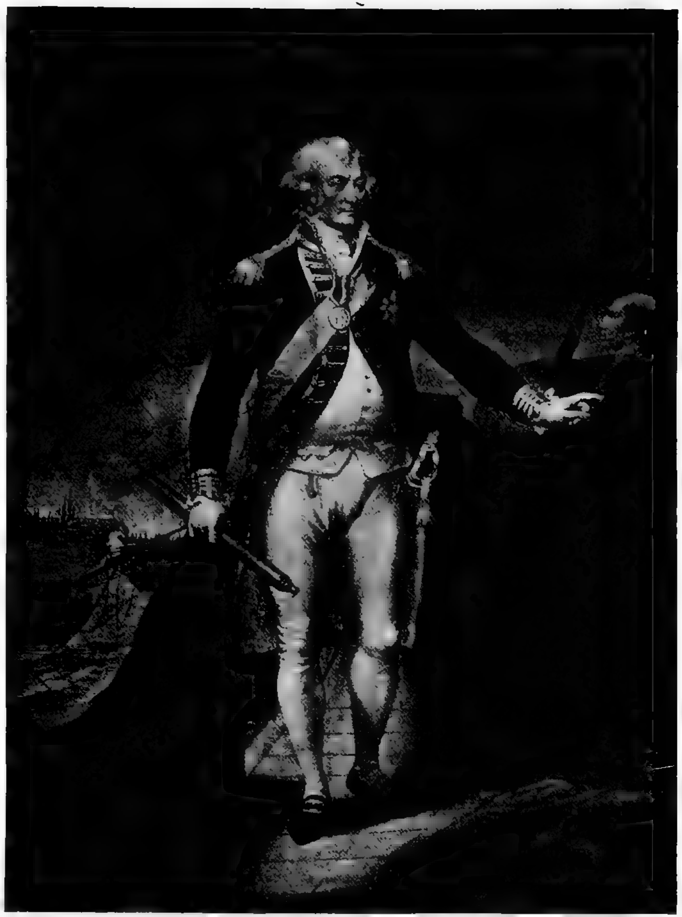


ADMIRAL BOSCAWEN, 1711-1761.



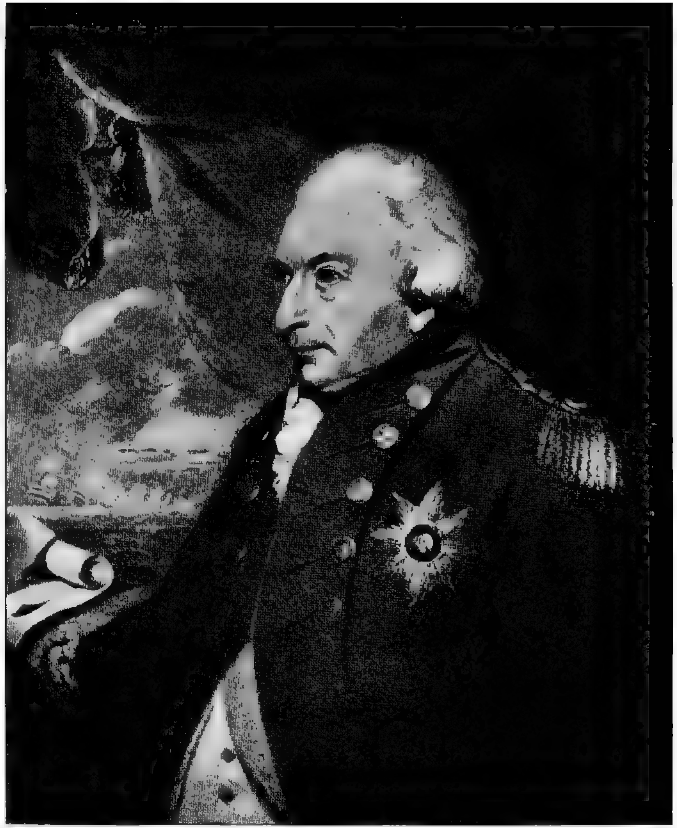
LORD RODNEY, 1719-1792.

found in the inglorious nature of the peace of Aix-la-Chapelle in 1748, and affairs were little better when the war was resumed in 1756. Our admirals had not yet learned that once the enemy is sighted it was their duty to get to close quarters as soon as possible, and to remain until victory had declared itself on one side or the other. Byng met a French squadron off Minorca and returned to Gibraltar without relieving the island. For this want of enterprise he was shot on board the *Monarque* at Portsmouth in 1757. Some such stern lesson was indeed needed, but the lack of decisive actions during that period was to a great extent due to the regulations which prescribed a certain method of fighting, and to which admirals found themselves bound to conform. If they could not attain a certain position the battle was indecisive, or the two fleets did not come in contact. The enemy knowing this could decline an action, if so disposed, by skilful manœuvring, and this accounts for what would otherwise appear inexplicable, two hostile fleets being in sight of each other for days without other than a distant or desultory cannonade. Gradually and under powerful influences a beneficial change was produced. The energy and dominating will of the first Pitt acted like a spur on both services. There was indignation throughout the country at our want of success, and he was its mouthpiece. Speaking in Parliament: "He declared solemnly that his belief was there was a determined resolution, both in the naval and military commanders, against any vigorous exertion of the national power. . . . Scarce a man could be found with whom the execution of any one plan, in which there was the least appearance of danger, could with confidence be trusted." Exaggerated as this language was, for as regards the Navy Hawke was doing good service, it had a useful effect, and the fleet soon after showed in Quiberon Bay that when well led it was capable of great deeds.



By permission of Messrs. Sampson Low, Marston & Co.

ADAM DUNCAN, LORD CAMPERDOWN, 1731-1804.



ADMIRAL OF THE FLEET LORD ST. VINCENT.

1735-1823.

If we had hitherto been enabled with varying success to maintain our command of the sea, we were near losing it during that period from 1775 to 1783, when we had opposed to us the forces of France, Spain and Holland, in addition to the revolted colonies of North America. In the West Indies Rodney and Hood were successful, while Hughes in India, by hard fighting, foiled Suffren in his attempt to gain supremacy in those seas. Suffren, perhaps the ablest naval officer France has produced, was at a disadvantage in having no base nearer than Mauritius, and, like several of our own admirals, had not zealous and loyal captains or proper support from home. That he more than held his own is a proof of his genius as a commander.

When our fleets once more took the sea in 1793, we had been more or less at war for a century. Though our ships had increased in size, they did not differ materially from those which contended in the Dutch wars a hundred years before. Fire-ships had practically disappeared, and a regular system of tactics had taken the place of the confusion which then characterised the movements of a large number of ships collected together; but the weapons in use had made little advance. We still impressed seamen when required, a method which had one advantage of rapidly augmenting our crews. Discipline alternated between extreme severity and great laxity. There was still a great lack of discipline among the officers, especially those in command. They resented interference with their own actions or the control of their ships. Lord St. Vincent changed all this. He soon gave captains to understand they had to obey as well as their subordinates, and when he ordered them to sleep on board in harbour, or attend a watering party on shore, it had to be done. There were murmurings at first, but after a dismissal or two they saw the necessity of conforming, and henceforward a healthier tone prevailed among the senior ranks.

THE *VICTORY* GOING INTO ACTION AT TRAFALGAR.

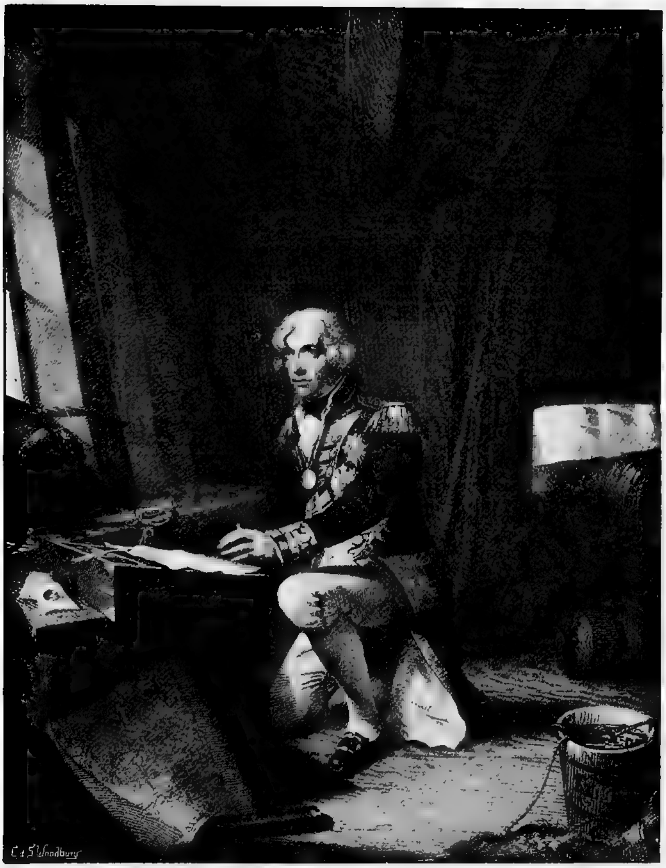
(*After De Martino.*)

B

We did not find hereafter the hanging back of a captain in action in a fit of pique at some word or deed of his commander-in-chief. There is no trace of it in Nelson's fleets. He calls his captains a band of brothers, and no doubt much of the support they gave him was due to personal affection; but the absolute obedience had been ingrained in them by Lord St. Vincent, and I look upon him as the man to whom is principally due our successes at sea during that war.

At the battles of the Nile and Trafalgar a portion of the French fleet in each case was hardly engaged at all, but made their escape when the issue was no longer doubtful. In both detachments was an admiral! I cannot conceive that if the result had been reversed any admiral or captain in Nelson's fleet would have left their beloved chief even if certain destruction was to be their fate. That is the perfection of discipline and co-operation. The war that came to an end in 1815 decided the rivalry at sea between France and England, created by Louis XIV. and continued by his successors. Both had competed for what had in turn been held by Spain, Portugal and Holland, and to England fell the inheritance. It carried with it ocean commerce and colonial expansion.

Though our fleet had been uniformly successful in European waters, it had not the same good fortune in the West during the war of 1812 with the United States. Even in the few years which had elapsed since Trafalgar, a relaxation of discipline was noticeable, and the daily exercises insisted on by Lord St. Vincent were not generally carried out. "It is of the first importance," he said to his captains, "that our crews should be perfect in the use of their guns; I therefore wish that every day, whether in harbour or at sea, a general or partial exercise should take place on board every ship in the squadron." But he was no longer present, and captains fell back into their old ways. This is alluded



T. J. Barker. *Engraving by F. Jouberi.*

NELSON AT PRAYER IN HIS CABIN BEFORE THE BATTLE OF TRAFALGAR.

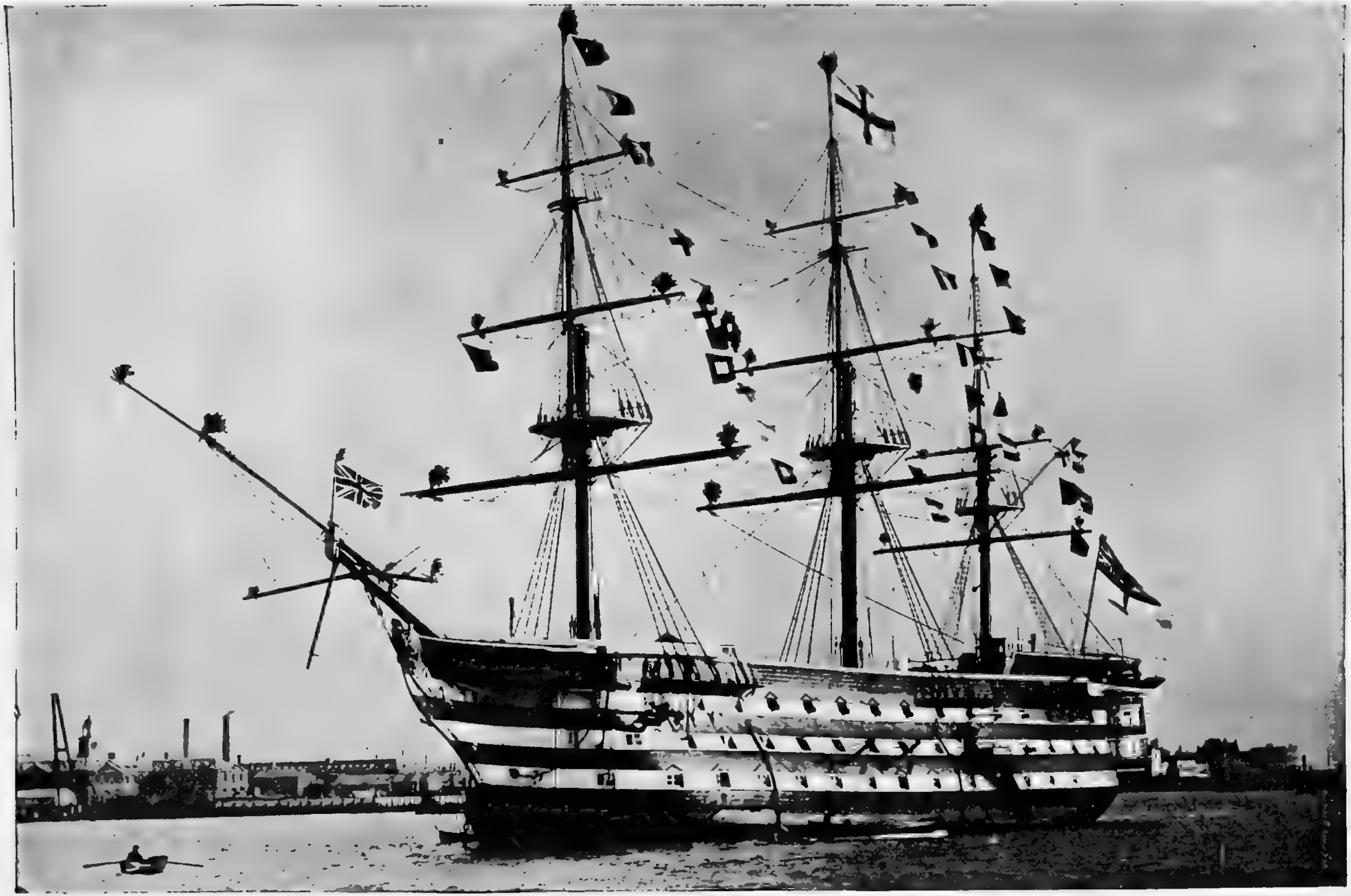
to by Roosevelt in his excellent history of the war of 1812: "A continuous course of victory won mainly by seamanship had made the English sailor over self-confident, and caused him to pay little regard to gunnery. While the American seamen were constantly firing at marks, the British seamen, except in particular cases, scarcely did so once in a year. Many captains never put a shot in their guns till the enemy appeared; they employed the leisure hours of the men in handling the sails and in decorating the ship." The result was that we lost several single-ship actions. In the case of the *Shannon* we have an example of what careful training and practice can do. As Roosevelt says: "The *Shannon's* guns were all carefully sighted, and the crew were exercised at them every day. Twice a week they fired at targets." There were no fleet actions because the United States had no line-of-battle ships, and only first built this type in 1815. Our naval supremacy was not therefore impaired by the failure of individual ships.

II.

STEAM AND OUR EARLY IRONCLADS.

During the long peace which ensued between 1815 and 1854, the only striking change in naval equipment was the introduction of steam. Ships continued to grow, but their shape and construction did not materially alter. The idea of steamers, as first applied in the paddle-wheel vessel, did not have a favourable reception in the minds of seamen. They objected to the clumsy paddle wheels, and saw danger in the boiler from projectiles. The screw propeller was to many equally objectionable. When in 1837 Ericsson took the Lords of the Admiralty for a trip on the Thames in his screw-propelled launch *Francis B. Ogden*, they did not think much of the invention. With the power applied at the stern they anticipated difficulty in steering. But in spite of naval conservatism both paddle and screw slowly made their way in the fleet, the former in special vessels, while the latter was adapted to our line-of-battle ships. It was to be an auxiliary to their sail power. A few officers recognised the great change that was impending, but the majority clung to the past. Thus, in 1854, when we joined France against Russia, and despatched fleets to the Black Sea and Baltic, only a certain number of the ships were propelled by steam. By clearing our harbours a formidable force was collected, but the old difficulty of manning it again cropped up. Large bounties had to be resorted to, and a number of individuals who had no pretensions to being seamen found their way into our ships. This was especially the case as regards the Baltic fleet, but by dint of continuous drilling a fair amount of efficiency was attained. As the Russian fleet did not, either in the Black Sea or Baltic, contest our naval supremacy, this war did not afford any complete test of our skill at sea. Under these circumstances the work of the Navy in this war has not received its proper attention. Independent of the fact that the expedition to the Crimea was impossible without an assured command of the sea, the fall of Sebastopol was mainly due to the assistance given by the fleet. Of the guns placed in position to overcome the Russian defences, between seventy and eighty were furnished by our ships, while the naval brigade, which did such good work during the siege, consisted of 3,300 officers, seamen and marines. Little has also been recorded of the important operations carried out by the Navy in the Sea of Azoff.

This war was the connecting link between the past and the present Navy. It was the death-blow to our wooden walls and gave birth to the ironclad. The terrible effect of shell against wooden structures was realised in one quarter at least, and from that time it was evident that fleets in future would have an entirely different character. There was no gradual evolution, but a leap from the 120-gun wooden line-of-battle ship to the iron frigate carrying one quarter the number of guns but burdened with over a thousand tons of armour four inches thick. Such was now to represent the power of nations at sea, and which, with the same advance in dimensions as characterised the wooden ships from one century to another, has continued to do so up to the present time. Though I do not intend to dwell otherwise than briefly upon our early ironclad fleet, it is useful to recall one or two of the characteristics of the first representative. When completed for sea in 1861 the *Warrior* had a displacement of 8,820 tons, of which 1,350 tons were devoted to



Reproduced from the "King" by kind permission. *Photo, Cribb.*

H.M.S. *VICTORY* AT PORTSMOUTH ON TRAFALGAR DAY.

Decorated with garlands and flying the celebrated signal "England expects that every man will do his duty."

armour, that is to say, less than one-sixth of her displacement was given to the defence. This cannot be considered an inordinate amount, but later on we find the weight of armour carried is doubled, while the total weight of the ship only advanced 2,000 tons. As showing how backward we were in ordnance, the first armament of the *Warrior* consisted of smooth-bore guns, but the anomaly was removed soon after her completion by the substitution of 7-in. rifled pieces. The armour at the water line did not extend to the ends, but this being recognised as a defect, following ships of a similar type, such as *Achilles*, *Bellerophon* and *Agincourt* class, were given a complete belt of armour. As if now to make up for past dilatoriness, artillerists were rapidly developing the power of rifled guns. Armour had to be thickened to meet their attack, and the area it covered reduced to some extent to obviate the necessity for such enormous dimensions of vessel to which we afterwards attained. Mr. E. J. Reed, the chief constructor of the British Navy, was equal to the demand, and in the *Hercules* produced a vessel no larger than the *Warrior*, which had a complete armour belt twice as thick in central portion as the *Warrior* carried, while her armament consisted of guns each of which weighed eighteen tons. When completed she was considered the finest battleship afloat, but was surpassed by her sisters, the *Sultan* and *Alexandra*, shortly afterwards. Though all are now over thirty years old, only lately have most of them been struck off the effective list.

The broadside system of carrying guns was now superseded by the turret vessel, in which the main armament was limited to four guns of immense weight. The competition between ordnance and armour had been keen and continuous, but certainly, while the attack showed great skill and ingenuity, the defence was entirely lacking in originality. The design and manipulation of guns weighing thirty tons

THE *QUEEN* OF QUEEN VICTORIA'S NAVY (1839).

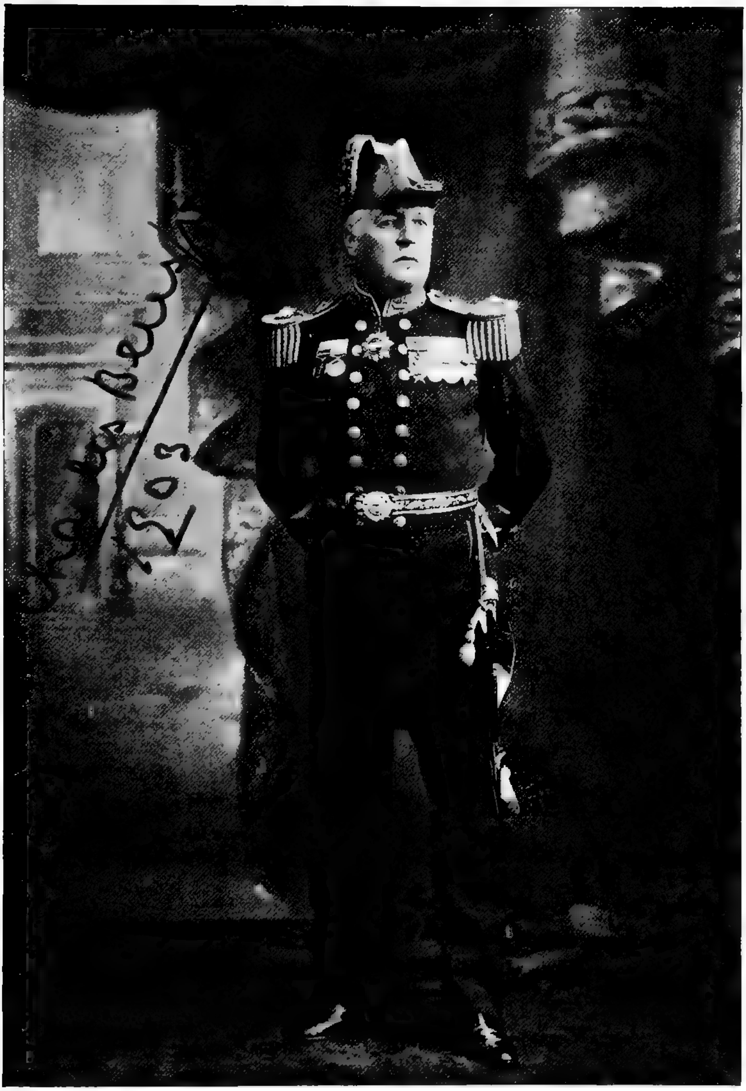
By kind permission of the "Navy and Army Illustrated."

and upwards involved the solution of many problems hitherto unconsidered—such as the improvement of gunpowder, application of the hydraulic principle for loading and controlling recoil, with new methods of sighting and firing. All were successfully worked out and adopted. The defence had no better idea than that of increasing the thickness of armour, until we arrived at the monstrosity of a ship being burdened with twenty-four inches of iron on her sides. It can hardly be doubted that if a sufficient inducement had been offered metallurgists would have given us years ago some worthier substitute, some improvement in the material, such as we now find in steel treated according to the Harvey and Krupp processes.

In our early turret ships we observe the immense weight of armour carried in proportion to displacement of ship. The first, the *Devastation*, of 9,500 tons, had 3,000 tons of armour, but it was carried to the fullest extent in the *Dreadnought*, of 10,850 tons, in which the armour actually absorbed 3,600 tons, or practically one-third of the whole weight. Hence only four guns, each from thirty to forty tons weight, could be mounted in two turrets. This was the extreme limitation of gun-power we reached in the line-of-battle ship thirty years ago, and it affords a curious contrast to the 120-gun ship of the old Navy.

Owing to her efficient protection and other qualities, the *Dreadnought* was highly thought of in the Navy.

The *Inflexible*, which followed the *Dreadnought*, cannot be considered any great improvement on the latter. With an extra 1,000 tons displacement she carried, it is true, four 80-ton guns, but her armoured defence, though in aggregate weight slightly less than in the *Dreadnought*, had the grievous defect that it protected only a small portion of the hull. This enabled a thickness of twenty-four inches of iron to be carried—a fact which neither compensated for its



Charles Beresford
1903

Photo, Maull & Fox.

VICE-ADMIRAL THE RIGHT HON. LORD CHARLES BERESFORD, K.C.V.O., K.C.B.

limitation nor gave that general protection against shell fire for which armour was introduced.

The *Inflexible* was launched in 1876 and completed in 1880, her total cost being £900,000. She took part in the bombardment of the Egyptian forts at Alexandria in 1882, and was sold last year, with machinery and guns on board, for £20,000. Most of the other early ironclads have either been sold or converted into depôt ships.

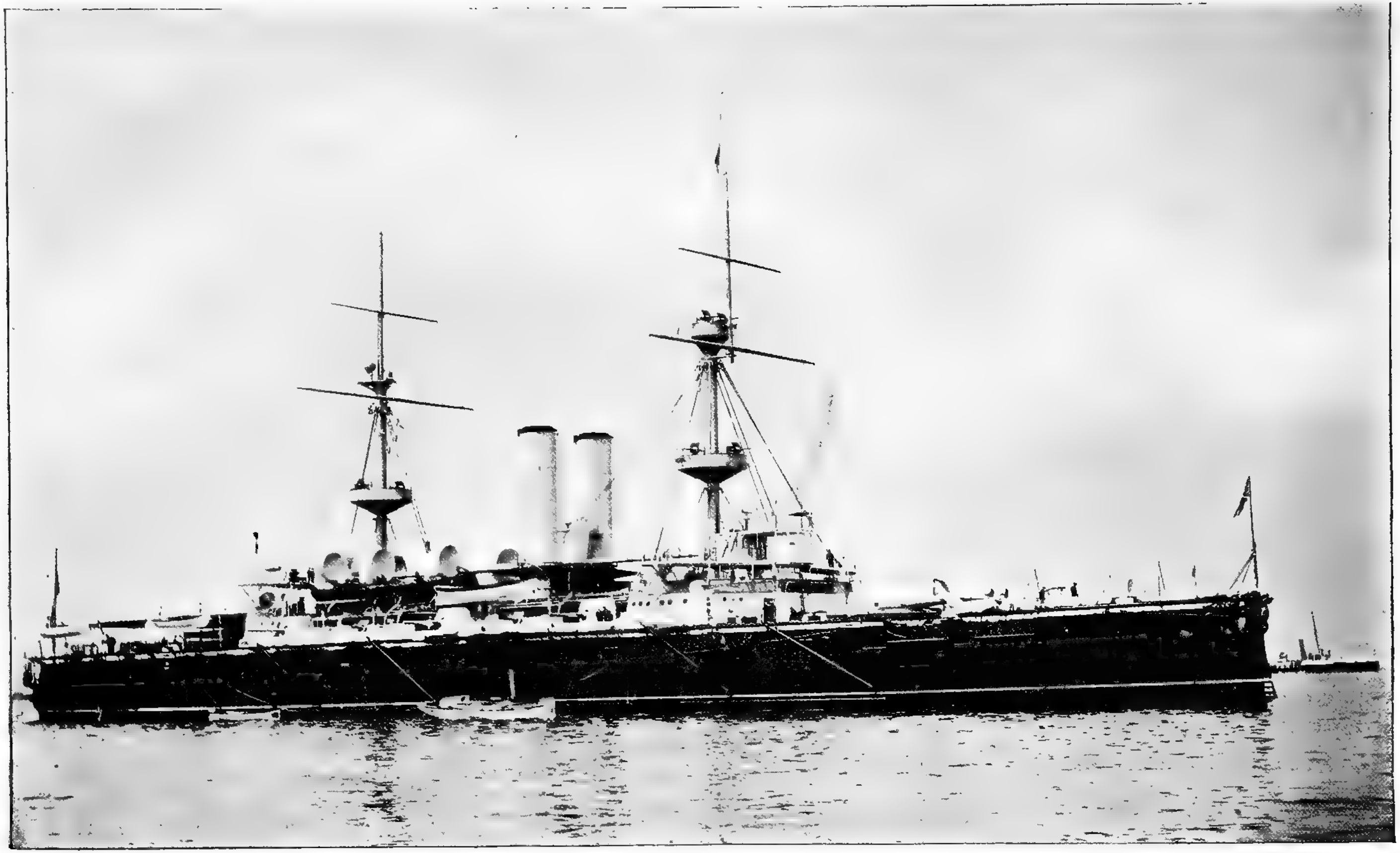
III.

OUR PRESENT IRONCLAD FLEET.

It was inevitable that a reaction should follow upon the train of reasoning which produced such vessels as the *Inflexible*, *Ajax*, *Agamemnon*, *Colossus*, and *Edinburgh*. This took the form of abandoning the turret for the barbette, and adding a secondary armament to the four heavy guns. Unfortunately, the reaction did not extend to the armour, which had only now been improved to a certain degree by imparting to the wrought-iron plate a hardened surface. Thus it was still necessary to retain a considerable thickness over a small area; while the greater portion of the hull, including the ends, had no protection. The ships designed and constructed on these principles were those known as the "Admiral" class, consisting of the *Collingwood*, *Howe*, *Rodney*, *Anson*, *Camperdown*, *Benbow*. All were under 11,000 tons, and four of them carried as a main armament two pairs of 67-ton guns, each pair mounted *en barbette* at the fore and after portions of the ship. The auxiliary battery comprised six 6-in. guns, three on each broadside. In the case of the *Collingwood*, she being nearly 1,000 tons smaller, four 45-ton guns were carried instead of the heavier ordnance. A greater departure was made in the *Benbow*, for a single 110-ton gun at each end took the place of the two-67-ton guns, while her secondary armament was increased to ten 6-in. guns. The offensive power of these ships is therefore considerable, while they were given an advance of three knots in speed over the *Inflexible*. A special feature also was their large coal supply, a matter which had not always hitherto received the attention it deserved. The defect of the "Admiral" class is the absence of protection to the auxiliary battery, and to so much of the bow and stern. By additions of weight during construction they also drew nearly two feet more water on completion than as originally designed, which unfits them for service in rough waters. They are condemned by many officers for these reasons, but they are still formidable ships, and would constitute an effective reserve squadron for home waters in time of war.

I have dwelt on these vessels because they were the forerunners of the present type of first class battleship, of which we now have a considerable force. Hitherto we had resolutely set our faces against the construction of any war vessel which should exceed 12,000 tons. Though this maximum had in several cases been exceeded by Italy, other nations had not followed her example. They were doubtless influenced by the "too many eggs in one basket" argument, and sensible of the risks of disablement by ram or torpedo.

But the development and increase of quick-fire guns now carried in battleships made it evident that in new constructions better provision must be made for protecting a larger portion of the hull and the secondary armament. No decrease of gun-power was likely to be approved, while naval opinion was strong in favour of high speed and large coal supply. As, moreover, the armour had not then been improved sufficiently to warrant any considerable reduction in thickness, it was, perhaps, inevitable that new designs would, in order to secure all these advantages, have to exhibit a large advance in total dimensions. Hence, when the uneasiness of the country at our tardy naval progress encouraged the Government at the end of 1888 to prepare a substantial programme of shipbuilding, no objection was found with the *Royal Sovereign* and her sisters because it was proposed they should be of 14,150 tons. Yet the actual armament was not greatly in excess of that given to the *Camperdown*



H.M.S. *EMPRESS OF INDIA*, FIRST-CLASS BATTLESHIP.

Photo, Symonds.

Launched 1891. Of 14,000 tons. Armament: Four 13·5-in., ten 6-in., sixteen 6-pdr., twenty-two smaller guns. Seven torpedo tubes. I.H.P., 13,000. Speed 17·5 knots. Coal capacity, $\frac{900}{1450}$ tons. Crew, 740.

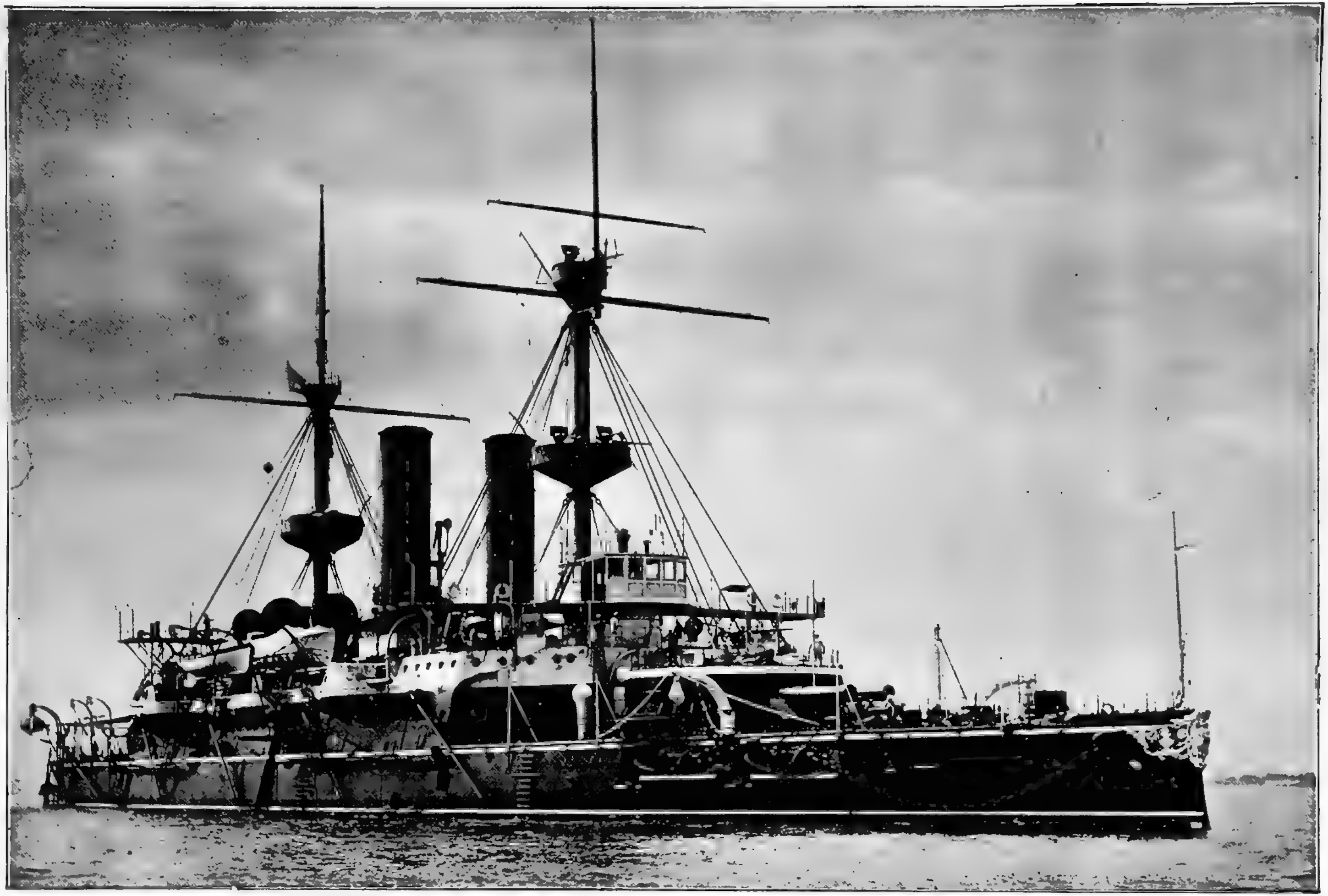
Names of sister ships, *Ramillies*, *Repulse*, *Resolution*, *Revenge*, *Royal Oak*, *Royal Sovereign*.

of 10,600 tons. The new vessels carried four 67-ton guns and ten 6-in. guns, or an addition only of four 6-in. guns. The increase of 3,500 tons in displacement was in a great measure absorbed in additional armour—providing casemates for 6-in. guns, and protecting a larger area of the hull. Thus it came about that these battleships actually carry 4,500 tons of armour externally and internally; almost one-third of their total displacement. Additional weight also was required for more powerful machinery to obtain a speed of 17 knots, while the demand that our Fleet should be able to act at a distance from its base necessitated an increase to the coal supply. This is the more imperative now, owing to the daily consumption of fuel for lighting, distilling and other purposes, which is a considerable drain upon the bunkers even when at anchor.

Except in the case of one of the eight of the *Royal Sovereign* class—the *Hood*—these vessels carry their 67-ton guns *en barbette* in positions similar to the "Admiral" class. A great change was, however, made in the disposition of the auxiliary armament. The ten 6-in. guns of the *Benbow* are all on one deck in an unprotected battery. Hence, a single large shell bursting in this part would create great havoc with guns and gunners. Greater distribution, as well as protection, was seen to be desirable. In the *Royal Sovereign* these improvements were obtained by placing the guns in two tiers, four in the battery, and six above on the upper deck. The former were isolated from each other by casemates, while the latter had stout shield protection. These also are now being placed in casemates.* It is curious we should thus, in a measure, revert to the principle of the old two-decker, and no less probable that an extension of this system would mark future construction. Such an

---

* Except in the case of the *Hood*, it being undesirable to increase weight on upper deck, owing to her having turrets.



H.M.S. *HOOD*, FIRST-CLASS BATTLESHIP.

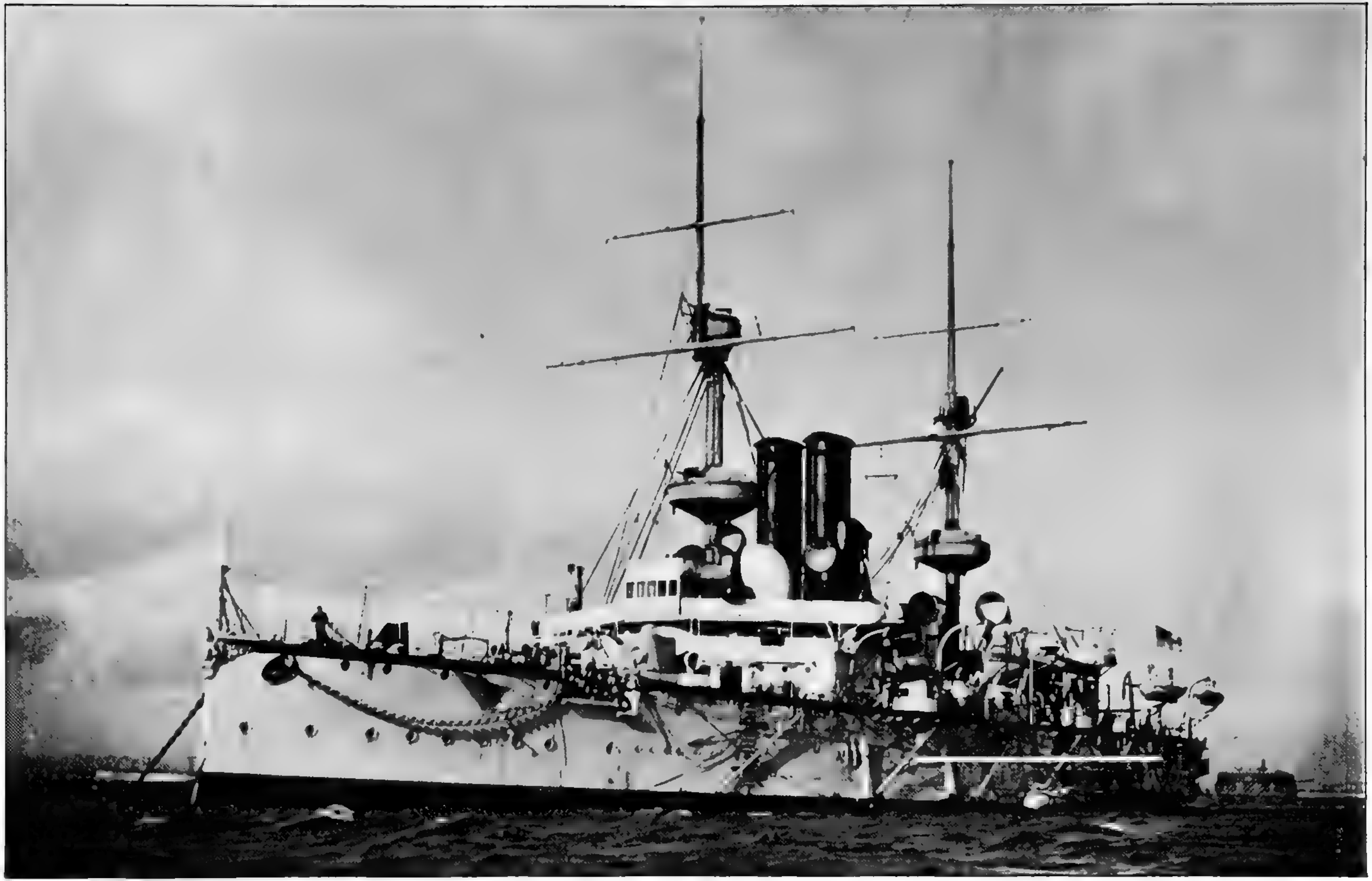
Photo, Symonds.

Launched 1891. Of 14,150 tons. Armament: Four 13·5-in., ten 6-in., thirty-two smaller guns. Seven torpedo tubes. I.H.P., 13,000. Speed, 17·5 knots. Coal capacity $\frac{900}{1400}$ tons. Crew, 790.

extension is, in fact, visible in the vessels which immediately followed the *Royal Sovereign* class. The *Majestic*, *Magnificent*, *Cæsar*, *Hannibal*, *Illustrious*, *Jupiter*, *Mars*, *Prince George*, and *Victorious* exhibit for their advance to 14,900 tons a considerable accession of guns on the broadside. Besides a pair of 12-in. guns at each end,* they carry twelve 6-in. guns, and have, as a new feature, sixteen 12-pounder guns—eight on each side—as a supplementary armament. Thus, counting the heavy guns—four of 50-tons—which can all fire on either side, we have in these ships a broadside fire of eighteen guns, a condition which has not been reached since the first days of ironclads. Furthermore all the 6-in. guns are in casemates, hence well protected. It may be asked, How has it been possible to obtain all this with only an addition to the displacement of 800 tons? The solution is simple. By the use of improved armour, at last given to us by the Harvey process, we have been enabled to dispense with those enormous thicknesses which hitherto encumbered our vessels. In place of an 18-in. compound plate considered necessary up to the days of the *Royal Sovereign*, we could now obtain adequate protection to the water-line with a 9-in. Harvey plate, reinforced by the protective deck brought down to the lower edge of the belt, instead of joining the upper part. Such is the defence for the hull of the *Majestic* class, and thus we could provide additional casemates and cover a larger area of the side without any considerable additions to the total weight of armour carried. Taking them all round, these vessels are splendid specimens of naval architecture, and great favourites with the officers who have served in them. That they are costly, and equally susceptible with others half their size to the ram or torpedo, are points equally uncontrovertible.

---

* Though mounted *en barbette*, these guns have steel shields—front 9 in. thick—protecting the breech.



H.M.S. *CENTURION*, SECOND-CLASS BATTLESHIP. *Photo, Symonds.*

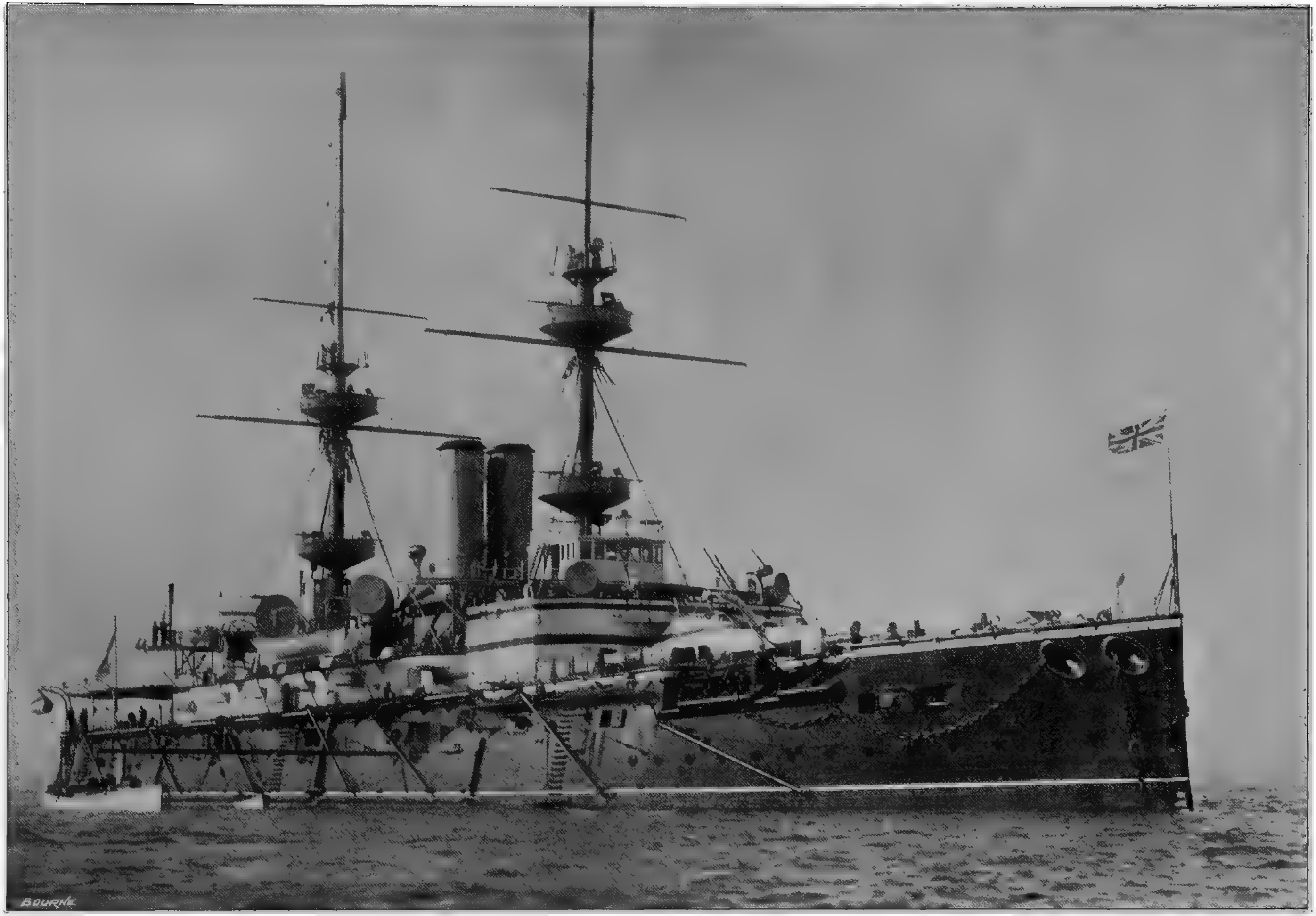
Launched 1892. Of 10,500 tons. Armament: Four 10-in., ten 6-in., twenty-nine smaller guns. Seven torpedo tubes. I.H.P., 13,214. Speed, 18 knots.
Coal capacity, $\frac{760}{1125}$ tons. Crew, 625.
Name of sister ship, *Barfleur*.

They do not dispose of the case in favour of moderate dimensions being also represented in our fleet.

From the foregoing it might be supposed that after the *Inflexible* we had abandoned the turret system in favour of the barbette for all sea-going battleships. That this was not the case the following remarks will amply show. I have alluded to the favour accorded to the *Dreadnought* by naval officers. The influence of this was sufficient to cause the construction of two ships—the *Nile* and *Trafalgar*—on her lines; that is, with a turret at each end containing a pair of 67-ton guns, while, as a concession to the impression that some auxiliary armament was now necessary, these vessels mounted in a battery between the turrets six guns of 4·7-in. calibre. Such an addition to the main armament of vessels like the *Nile* and *Trafalgar* of 12,000 tons is very inadequate, as the 4·7-in. gun is a weak piece, only suitable for cruisers.* In other respects these two later turret ships are powerful craft. They are surpassed only by one of the *Royal Sovereign* class—the *Hood*—which, in deference to the same feeling which produced the *Nile* and *Trafalgar*, was given turrets, while in all the others the barbette system was retained. The *Hood's* superiority to the *Nile* and *Trafalgar* consists in her carrying ten 6-in. guns as the auxiliary armament. There is yet to mention the single-turret ships, because they received their final development in the *Victoria* and *Sans Pareil.* It is safe to prophesy that for sea-going purposes the single-turret ship will never be repeated. The type originated at a time when an exaggerated view of the value of the ram prevailed. This was in the early seventies, and the outcome was a small ram—the *Rupert*—with a single turret forward. The idea was to fight end on, and having embarrassed the enemy with bow fire, his discomfort was to be completed with the ram.

---

* The 4·7-in. guns have now been replaced by 6-in.



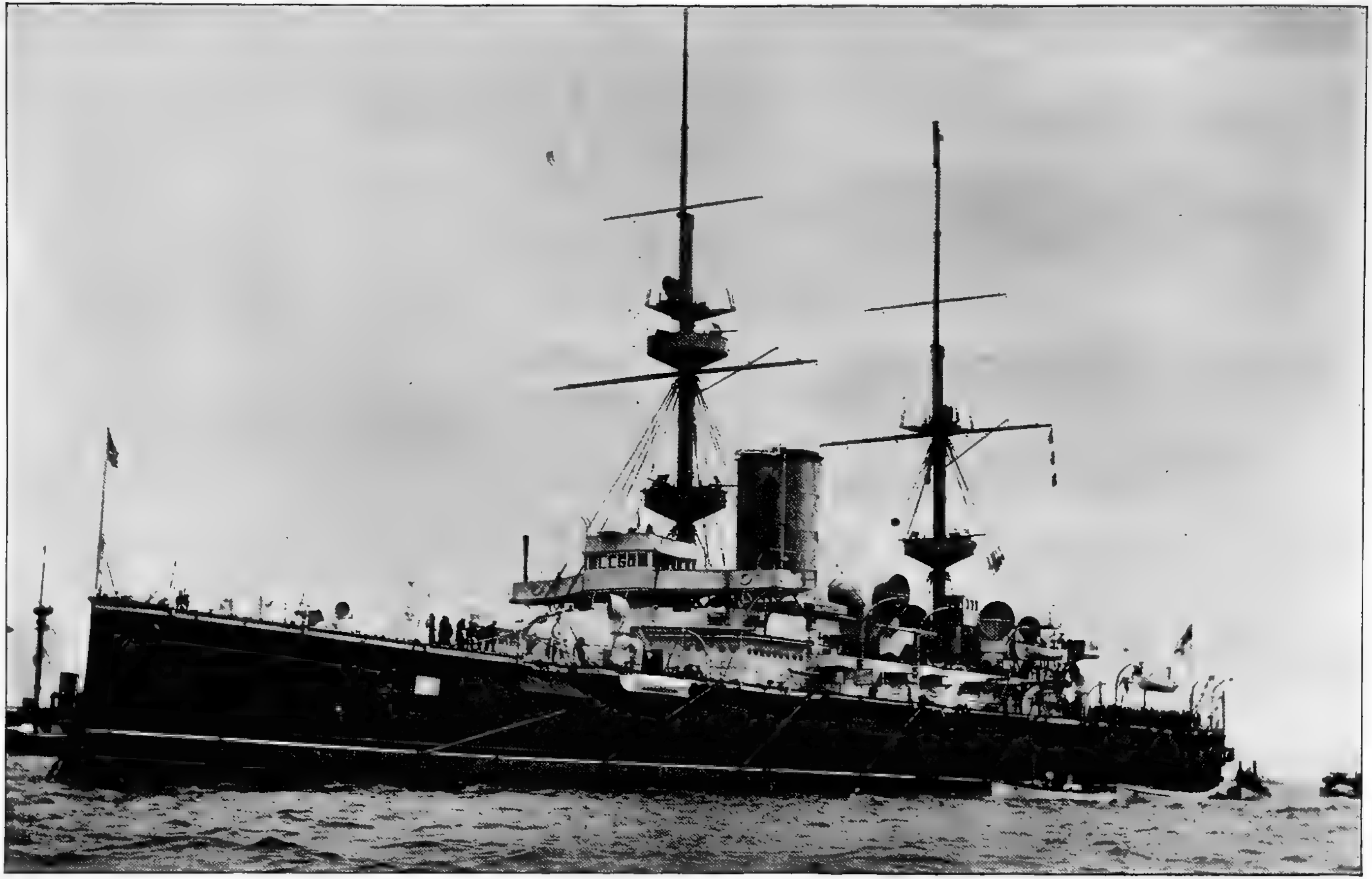
H.M.S. *MAJESTIC*, FIRST-CLASS BATTLESHIP. *Photo, Symonds.*

Launched 1895. Of 14,900 tons. Armament: Four 12-in., twelve 6-in. guns, eighteen 12-pdrs., twenty smaller guns. Five torpedo tubes. I.H.P., 12,000. Speed, 17·5 knots. Coal capacity, $\frac{900}{2200}$ tons. Crew, 757.

Names of sister ships: *Cæsar*, *Hannibal*, *Illustrious*, *Jupiter*, *Magnificent*, *Mars*, *Prince George*, *Victorious*.

There was sufficient sense in this view to convince the theorists and cause an extension of the principle. Hence the *Hero* and *Conqueror* succeeded the *Rupert* with the single turret forward. The weight of this necessitated a very low bow, and therefore militated against their use for ocean service. But the principle survived, and found its climax in two later vessels. Each step was marked by an advance in size: *Rupert*, 5,000 tons; *Conqueror*, 6,500; while in the *Victoria* and her sister there was a jump to 10,500 tons. But in these the single turret had to bear two of the much abused 110-ton guns. It was an immense burden to concentrate at one end; and when we think of this weight augmented by a great mass of water in that locality, as on that terrible day when the *Victoria* disappeared from sight, one cannot be altogether surprised that her buoyancy was overcome.

The *Sans Pareil* remains as a solitary specimen of the large single-turret ironclad, her monster ordnance supplemented by a 10-in. gun aft and twelve 6-in. guns on the broadside. She is not likely to be repeated. When we reflect that for many generations the wooden fleets included several sizes of ships considered fit for the line of battle, and that experience had shown the usefulness of moderate dimensions for general purposes, it was only natural that this tradition should be perpetuated in our early ironclads. We did not limit our construction to the larger type, but at the same time built comparatively small armoured ships, ranging from 4,000 to 8,000 tons. As we discontinued the practice some years ago, and many of those which formerly did excellent service have disappeared from the list, it is unnecessary to describe them in detail. Among many excellent characteristics, not the least valuable was that of light draught, which enabled them to pass through the Suez Canal when required to proceed to Eastern waters. In the

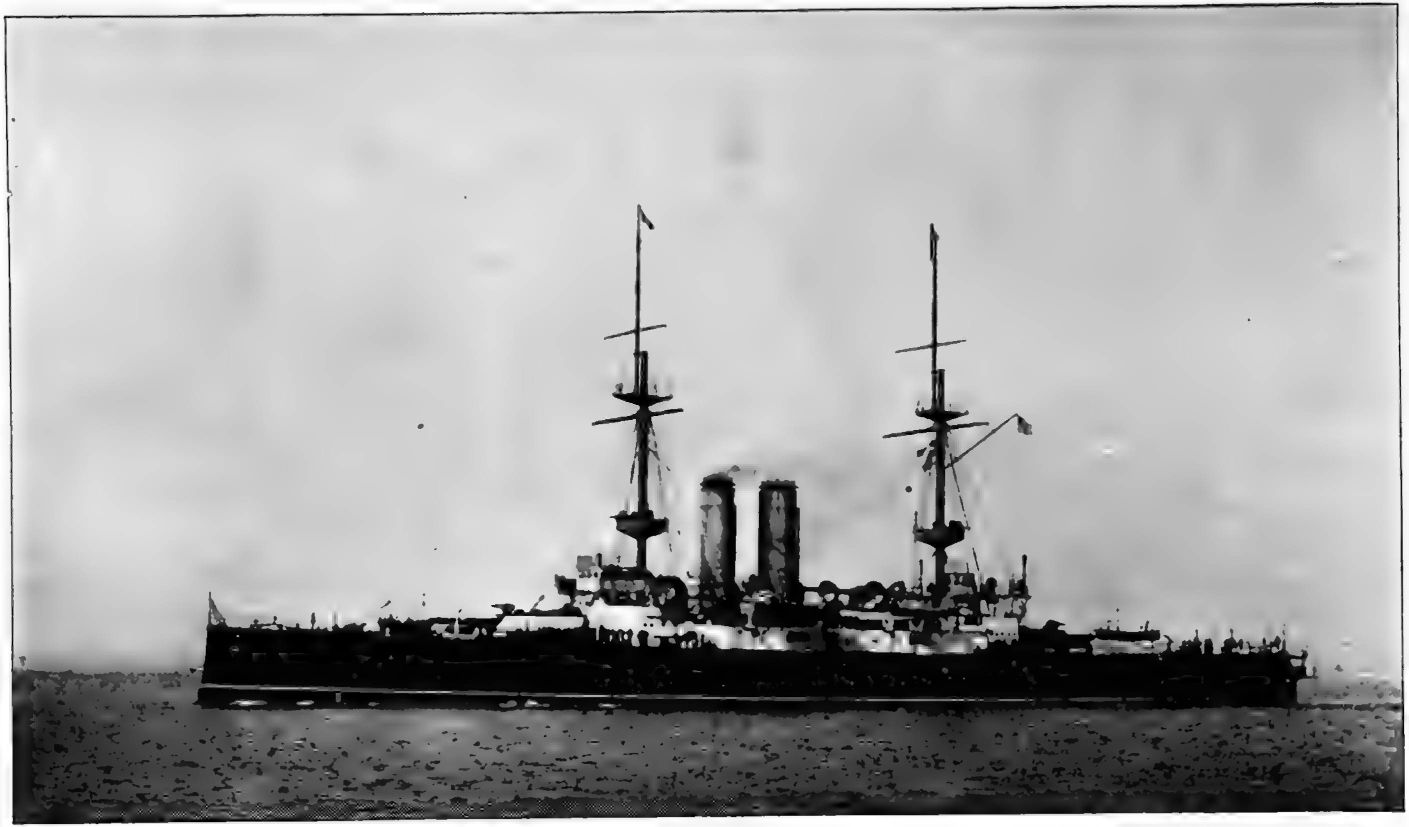


H.M.S. *RENOWN*, FIRST-CLASS BATTLESHIP. *Photo, West.*

Launched 1895. Of 12,350 tons. Armament: Four 10-in., ten 6-in., twelve 12-pdrs., twenty-two smaller guns. Five torpedo tubes. I.H.P., 12,000. Speed, 18 knots. Coal capacity, $\frac{900}{1450}$ tons. Crew, 674.

desire that every ship should be the best of its kind, the second-class ironclad gradually dropped out, but it was revived to a very small extent in the programme which gave us the *Royal Sovereign.* Two vessels, designated then second-class battleships, were squeezed in, and, on completion as the *Centurion* and *Barfleur*, gave us an excellent type for distant stations. But during incubation they had grown to 10,500 tons, and eventually were added to the first-class list. Their main armament consists of four 29-ton guns, supplemented by a battery, which when first constructed consisted of ten 4·7-in. guns, but which have since been replaced by the same number of 6-in. guns. The favour with which they were received led to an improved type in the *Renown*, with an increased displacement of 12,350 tons and an auxiliary battery of ten 6-in. guns, the main armament remaining the same as in the *Centurion* and *Barfleur.* She also carries fourteen 12-pounders and has five torpedo discharges, two of which are submerged. A considerable portion of the water line is protected by eight inches of hardened steel armour. This with a reduced thickness of six inches is extended up to the battery deck, where six of the 6-in. guns are in casemates, the other four guns being above. With an extreme speed of eighteen knots the *Renown* is little inferior to her larger sisters, though of course her 10-in. guns cannot compare in penetration and shell power with the 12-in. guns of the *Majestic.*

Averse to departing from the principle of mounting the heavy guns in pairs, but desirous of retaining the best weapon, the designers of the *Ocean* class—which may be considered as successors of the *Renown*—elected to mount in them four 12-in. and twelve 6-in. guns, while only increasing the displacement by 600 tons. Such an amount would not alone suffice for the additional armament, but weight must be



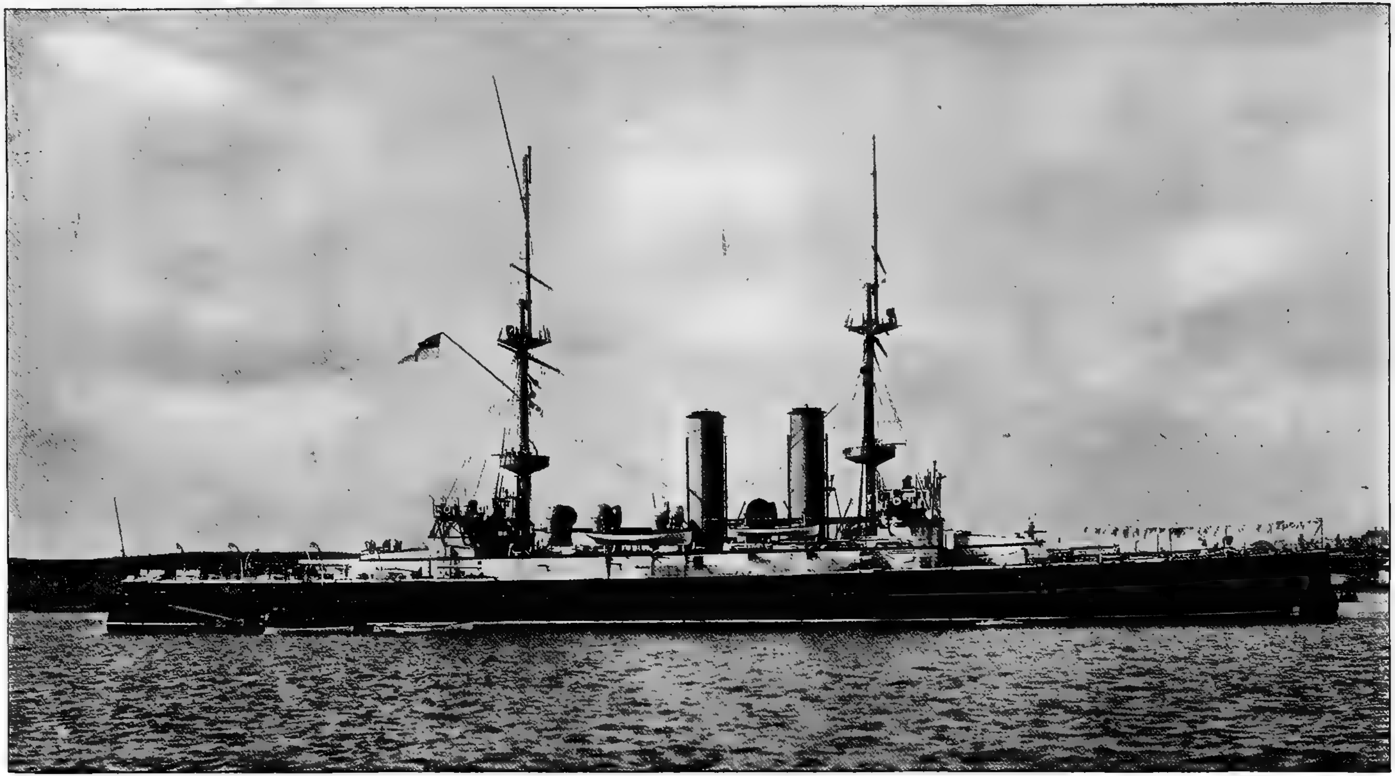
H.M.S. *CANOPUS*, FIRST-CLASS BATTLESHIP. *Photo, West.*

Launched 1897. Of 12,950 tons. Armament: Four 12-in., twelve 6-in., ten 12-pdrs., sixteen smaller guns. Five torpedo tubes. I.H.P., 13,500. Speed, 18·25 knots.
Coal capacity, ${}^{800}_{1850}$ tons. Crew, 700.
Names of sister ships, *Albion*, *Glory*, *Goliath*, *Ocean*, *Vengeance*.

saved in other directions, and in these vessels it is obtained by reducing the thickness of the armour at the water line to six inches. Some regard this as a dangerous reduction in view of the power of modern guns, and the fact that 7-in. and 8-in. quick firers are now being carried as a secondary armament. Personally I should advocate water-line armour of eight inches for such vessels as these, which might be required to cope with battleships of larger dimensions. Probably some such consideration led to the *Duncan* class, now just completed, being given seven inches of water-line armour. This, with a slight addition to the armament, and an increase of extreme speed to nineteen knots, brings their displacement up to 14,000 tons, or practically the same dimensions as the *Royal Sovereign* design of 1888. The second-class battleship has so grown since its birth in the *Centurion* and *Barfleur* that it has again disappeared, or become merged in its sister of the first-class, to which I must now return.

The success of the *Majestic* class led the Admiralty to supplement these nine vessels by eight others of slightly modified design. The *Formidable*, *Implacable*, *Irresistible*, *Venerable*, *Bulwark*, *London*, *Queen* and *Prince of Wales*, with practically the same armament, are more efficiently protected by having the bow forward of the 9-in. and 6-in. armour covered with 2-in. plates, which at the stem are carried below the ram. This will prevent the ship, when chasing, having her bow perforated by small projectiles, the effect of which in the consequent inrush of water might necessitate the ship stopping to remedy the evil. This prolongation of the belt forward is carried out also in the *Duncan* class and later armoured cruisers. With more powerful machinery to give a speed of eighteen knots the *Formidable* group have a displacement of 15,000 tons.

We had hitherto considered that two sizes of heavy guns



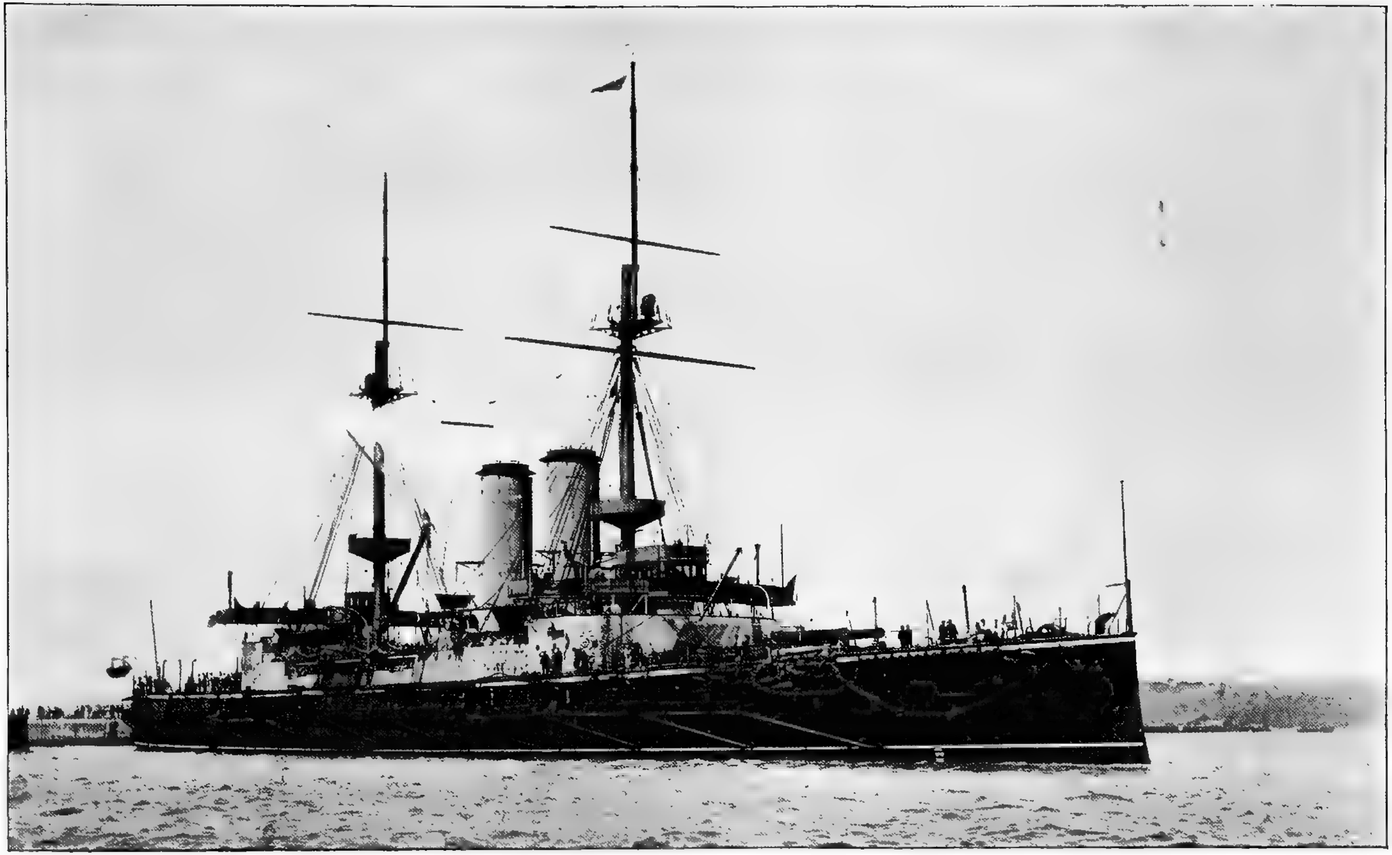
H.M.S. *BULWARK*, FIRST-CLASS BATTLESHIP. *Photo, Crockett.*

Flagship of the Mediterranean Fleet.

Launched 1899. Of 15,000 tons. Armament: Four 12-in., twelve 6-in., sixteen 12-pdrs., sixteen smaller guns. Two torpedo tubes, I.H.P., 15,000. Speed, 18 knots. Coal capacity, $\frac{900}{2000}$ tons. Crew, 750.
Names of sister ships, *Formidable*, *Irresistible*, *Implacable*, *London*, *Venerable*.

in a battleship would suffice; the 12-in. for the attack of that portion most thickly armoured, while the 6-in. projectiles would penetrate the thinner plating and gun shields, in addition to that considerable area of the hull without any protection. The increased power of the 6-in. gun, due to greater length and a better propellant, however, led to the medium armour applied for protection being given increased resisting power, chiefly due to improved methods of manufacture. Thus it outmatched the medium gun, or rather the projectiles, which were broken up on the very hard surface imparted to the plate. Hence it became necessary either to replace the 6-in. piece entirely by one of heavier calibre or to supplement it by something intermediate between that size and the 12-in. Various considerations at the time led to the latter course being adopted in the next and latest type of battleship. In the *King Edward VII.*, *Commonwealth*, *Dominion*, *New Zealand*, *Hindustan*, *Britannia*, *Hibernia* and *Africa*, now building, the armament consists of four 12-in., four 9·2-in. and ten 6-in. guns as the main weapons of attack, while for auxiliary purposes they carry fourteen 12-pounders and six smaller quick-firing guns, with four torpedo tubes, all of which are operated from below the water-line. The 9·2-in. guns are mounted singly in casemates, two on each side above the 6-in. battery, so that two can fire right ahead and two astern. The 6-in. guns are placed in a central battery, five on each side, each piece being separated from its neighbour by an armoured screen; thus the casemate system is modified by the gunroom being open at the rear. Should therefore a projectile penetrate the side it will not have armour in rear against which it might explode in close proximity to the gun, while if explosion is effected on passing through the front protection adjacent guns are screened from the pieces of the projectile.

This battery is practically an armoured redoubt secured



H.M.S. *RUSSELL*, FIRST-CLASS BATTLESHIP.

Photo, Johnson and Logan.

Launched 1901. Of 14,000 tons. Armament: Four 12-in., twelve 6-in., twelve 12-pdrs., six smaller guns. Four torpedo tubes. I.H.P., 18,229. Speed, 19 knots. Coal capacity, $\frac{900}{2000}$. Crew, 750.

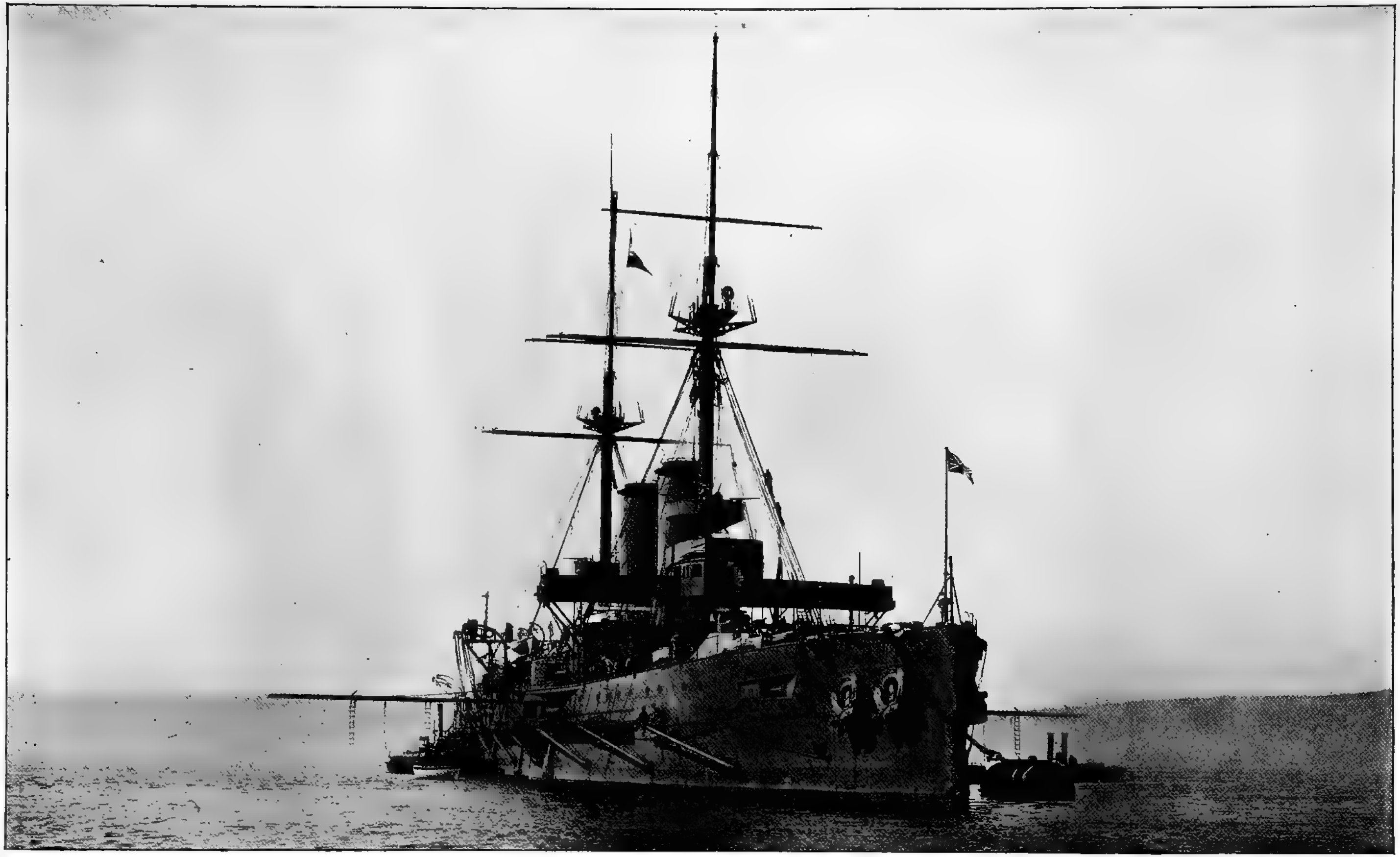
Names of sister ships, *Albemarle*, *Cornwallis*, *Duncan*, *Exmouth*, *Montagu*.

from raking fire by 12-in. armour at the fore and after ends, while on the sides the lower part has 8-in. and the upper part 7-in. plates.

The belt, 9-in. thick at the central portion, is carried to the ends, though in each case with a considerably reduced thickness. All this armour is of the latest hardened type.

Though it is not attempted in such a class of war vessel to obtain the extreme speeds considered essential in a first-class cruiser, the advantage of a knot or two in a group of battleships over an opposing squadron in allowing an advantageous position to be assumed is fully recognised in the design of the *King Edward VII.* class, for they have machinery for a maximum speed of 18½ knots an hour. When we remember that it was considered sufficient to provide for an extreme speed of 13½ knots in the *Inflexible*, the advance made in this respect in five and twenty years can be realised. To combine all the qualities here enumerated in the *King Edward VII.* it has been necessary to increase the length from 400 ft. in the *Formidable* to 425 ft., and the displacement from 15,000 tons to 16,350 tons. This is the largest battleship yet constructed, and it involves the expenditure of nearly a million and a half. It remains to be seen whether an even further advance is in store for us; but under any circumstances with such conditions the country whose most vital interests depend upon naval supremacy cannot expect security without paying an insurance adequate to the issue at stake.

Those who advocate limiting size in, and expenditure on, a single ship will assert there is some confirmation of their views by the action of the British Government in purchasing two battleships constructed for Chili by Armstrong and Vickers, Maxim & Co. Of approximately 12,000 tons displacement, and costing us just under a million sterling apiece, they combine a powerful armament, good protection



Photo, Crockett.

H.M.S. *QUEEN*, FIRST-CLASS BATTLESHIP.

Launched 1902. Of 15,000 tons. Armament: Four 12-in., twelve 6-in., sixteen 12-pdrs., sixteen smaller guns. Four torpedo tubes. I.H.P., 15,000. Speed, 18 knots. Coal capacity, 900 tons. Crew, 755.

Name of sister ship, *Prince of Wales*.

and high speed. They have a pair of 10-in. guns in barbettes at each end; fourteen 7·5-in. on the broadside—ten in a central citadel and four in casemates above. The citadel guns are screened from each other and in rear by armoured screens, so that they are not so boxed in as if within casemates. They have, besides, fourteen 14-pounders and two submerged torpedo tubes. The water line armour at central portion is seven inches thick, and this is carried up to cover the side of the citadel. The belt is tapered to a thickness of three inches towards bow and stern. Engines sufficiently powerful to drive these vessels twenty knots an hour in smooth water are provided, so that they may be considered the fastest battleships afloat at present. Whether it is necessary in this class of war vessel to have such a high speed is open to argument, for every additional knot is very costly in the extra weight of machinery involved, which weight might otherwise have gone into more armament, armour or coal supply. There is no question that speed is all important in the cruiser. For the battleship it is no doubt important to rapidly close an enemy and take up an advantageous position; but the main point is to keep there, which will principally depend upon superior gun fire, its weight and accuracy. If your adversary has the mastery in this respect your superior speed may then help you out of a hole, but on the other hand may have disappeared from the punishment inflicted by a more weighty armament. My readers may follow up the argument, but there is no doubt that in the *Triumph* and *Swiftsure*, which are the names given to our acquisitions, we have acquired two very useful vessels.

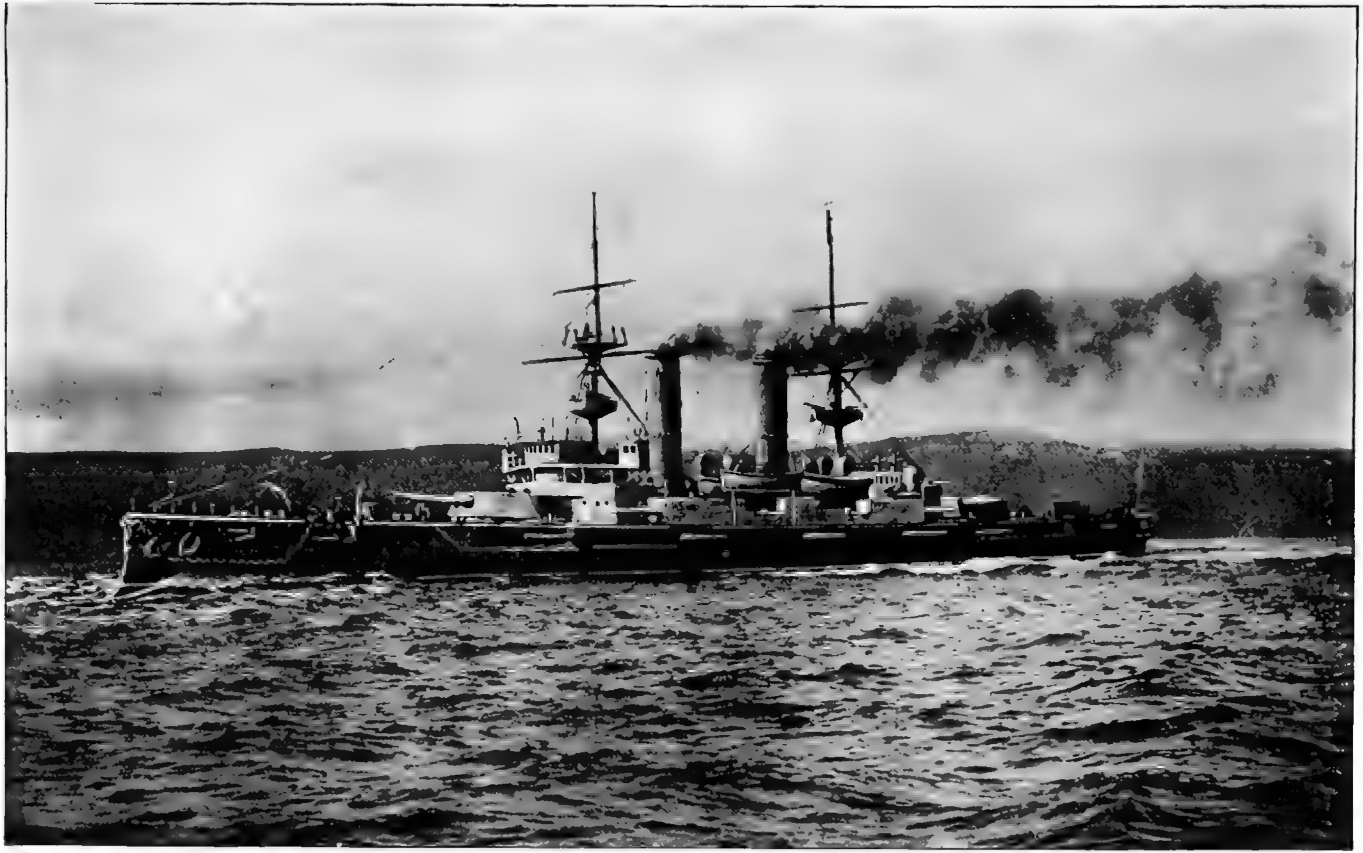
Two battleships of a new design, to be called the *Lord Nelson* class, will be laid down this year. Unless modified by naval operations in the Far East, we may expect to see increased power given to the auxiliary armament.

IV.

CRUISERS AND TORPEDO CRAFT.

Though the warlike strength of a nation at sea must be ultimately gauged by the force it can put in line of battle, the efficient employment of such can only be ensured by the possession also of numerous well-equipped lighter vessels which, under the modern term Cruisers, will in future do the work formerly imposed on frigates and sloops. They were the eyes of the fleet, and when attached to the squadrons were entrusted with the duty of getting and keeping in touch with the enemy until the main body came on the scene, while eluding capture themselves. Such a result could only be secured by frigates being swifter under canvas than the heavier vessels. It was superior speed only which made cruisers of old useful adjuncts to fleets; nothing else can be given the first place in what similar vessels to-day should excel. Curiously enough, in the transition stage between sails and steam, when we tried to adopt one without giving up the other, the above great principle was obscured, and we allowed cruisers to be constructed of actually inferior speed under steam to battleships. An extensive naval war at such a period would have given rise to the strange anomaly of many cruisers remaining in port for fear of capture, or, if met at sea by a battleship, being unable to escape. For years we were content with a speed of thirteen knots for our cruisers, while at the same time we were launching battleships two knots faster. It would take too long to trace the progress of these substitutes for the old sailing frigates, and they are only now chiefly used for training purposes. Fortunately, when we seriously began to resuscitate our fleet sixteen years ago, the right principle had been re-established, and cruisers once again began to be worthy of the name. It is more than twenty years since the *Iris*, a steel cruiser of nearly 4,000 tons, was completed, having a speed of eighteen knots; but for some time she and her sister, the *Mercury*, were the sole representatives of this advance in speed. It was not till 1889 that in the construction of our cruisers we fully recognised this essential quality, and laid down over thirty of this class with an extreme speed of twenty knots. Dependent upon steam power alone, this meant the provision of a large quantity of coal, with the result that the dimensions of cruisers have been growing equally with those of battleships. The steam and sailing frigates, *Inconstant*, *Raleigh*, *Boadicea* and *Euryalus*, ranging from 4,500 to 5,500 tons, have been replaced by the *Crescent* class of 7,500 tons and the *Blake* and *Blenheim* of 9,000 tons, coal supply being raised from 700 to 1,400 tons. The defence of these two latter vessels against gun fire is limited to a protective deck, although previously a cruiser of such dimensions had usually been given a belt of armour to at any rate keep the water line intact. A heavy gun of twenty-two tons forms the bow and stern chaser of *Blake* and *Blenheim*. Ten 6-in. guns form the broadside armament. With slight modifications, this is the type of several of our first-class protected cruisers, and they have proved well suited for distant stations. They are, however, surpassed by the *Powerful* and *Terrible*—in which the size has risen to 14,200 tons, in order principally that they may carry 2,600 tons of coal and have a speed of twenty-two knots, for their armament was not at first much in excess of that given to *Blake* and *Blenheim*. They have recently, however, been given four additional 6-in. guns.

Notwithstanding some adverse criticism, the *Powerful* and



By kind permission of Messrs. Vickers, Sons & Maxim.

H.M.S. *TRIUMPH* (ex *LIBERTAD*), FIRST-CLASS BATTLESHIP.

Launched 1903. Of 11,800 tons. Armament: Four 10-in., fourteen 7·5-in., fourteen 14-pdrs., twelve smaller guns. Four torpedo tubes. I.H.P., 12,500. Speed, 19 knots. Coal capacity, $\frac{800}{2000}$ tons. Crew, 700.

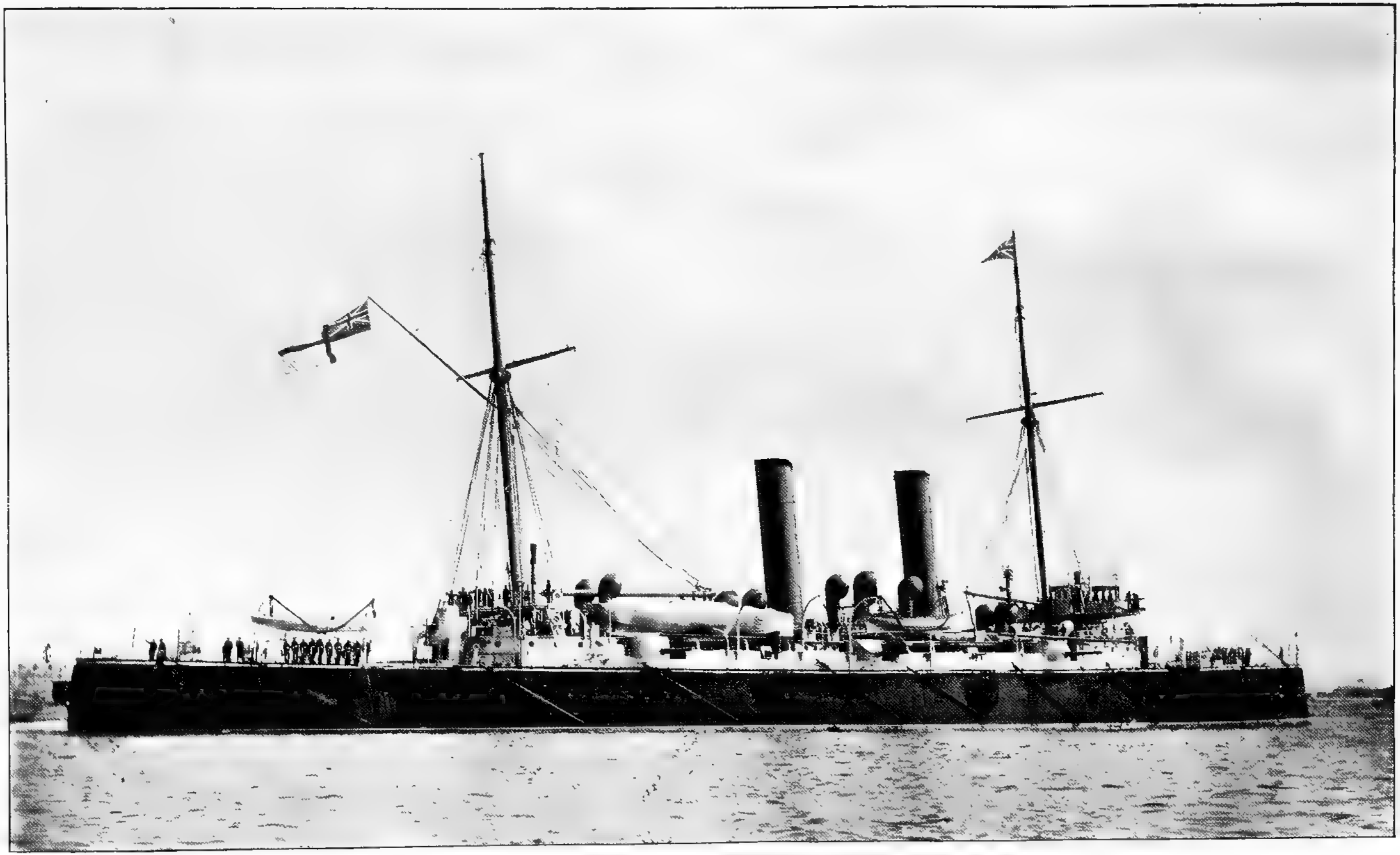
Name of sister ship, *Swiftsure*. These two ships were purchased from the Chilian Government.

Terrible have answered expectations. A modified type—the *Diadem* class of 11,000 tons—has also proved successful in steaming capacity, though the armament is considered defective by many because it comprises no gun heavier than the 6-in. There are eight of these vessels. Like the *Powerful* and *Terrible*, the protection to vital parts from shot and shell is limited to armour within the hull in the form of a protective deck.

This system is based on the consideration that given a limited amount of armour for protection it is best disposed in this manner; for if distributed on the outside of the ship the thickness must be so reduced as to afford little resistance against the attack of moderate sized projectiles. The protective deck when solely employed allows such missiles free entry, and then acts in guarding the propelling and directive power from their effects as well as preventing water that may have entered by penetration near the water-line from passing below and thus endangering the buoyancy of the vessel.

The principle is no doubt sound where size of ship prevents any extensive use of armour, but with large vessels —except for purely scouting and despatch duties—general opinion is in favour of keeping out as many projectiles as possible by placing the protection on, as well as within, the hull.

We carried out this idea twenty years ago by the construction of two armoured cruisers, as this type is called, the *Impérieuse* and *Warspite* of 8,400 tons, which have a portion of the hull at the water-line protected by ten inches of compound armour. The armament comprised four 9·2-in. and ten 6-in. guns. The success of this pair led us to follow them up with seven belted cruisers: *Orlando*, *Aurora*, *Narcissus*, *Australia*, *Galatea*, *Immortalité* and *Undaunted*, of smaller dimensions and two 9·2-in. guns, one at each end,



H.M.S. *GRAFTON*, FIRST-CLASS CRUISER. *Photo, Symonds.*

Launched 1892. Of 7,350 tons. Armament: Two 9·2-in., ten 6-in., twenty-six smaller guns. Four torpedo tubes. I.H.P., 12,000. Speed, 20 knots. Coal capacity, 850 tons. Crew, 560.

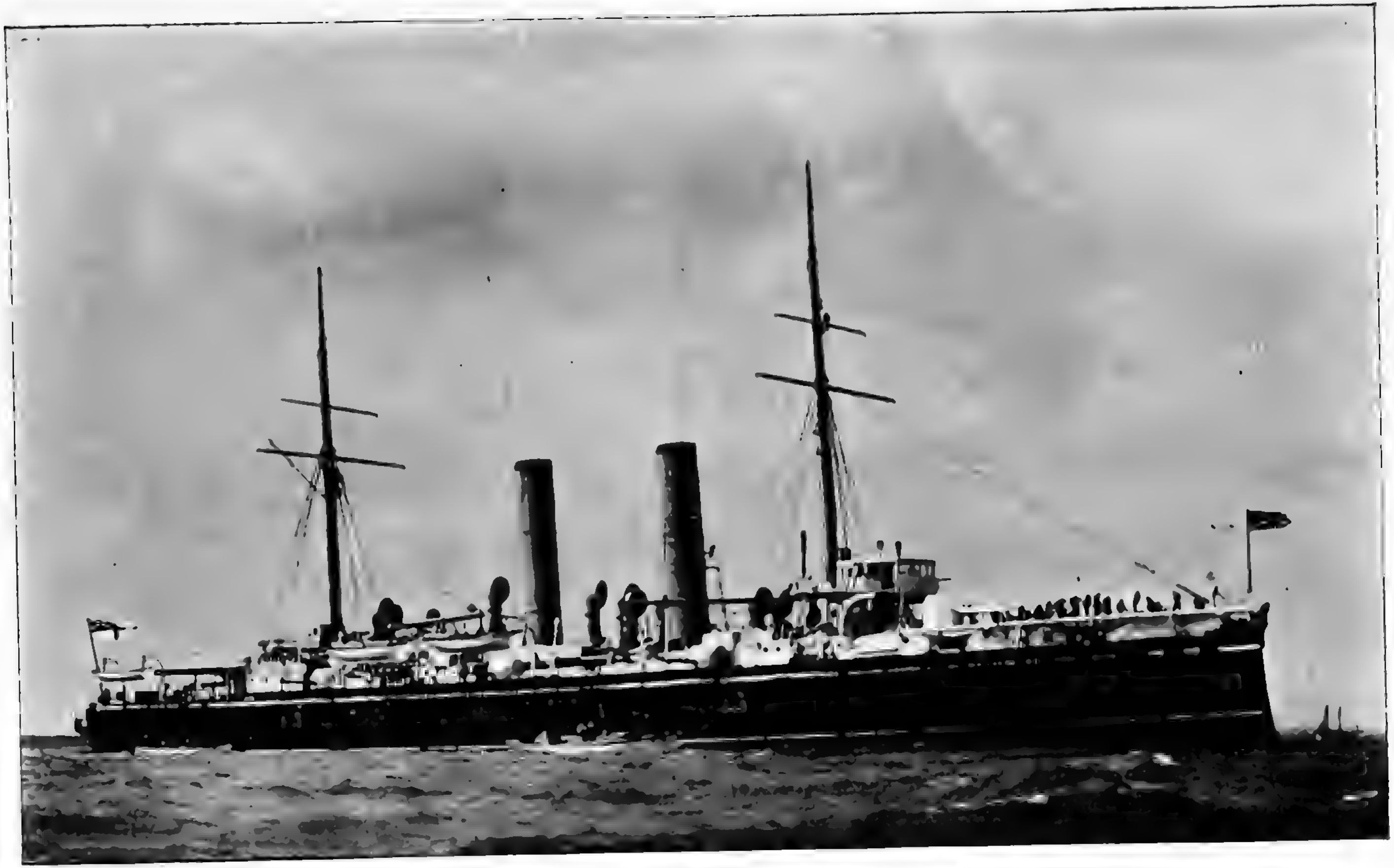
Names of sister ships, *Edgar*, *Endymion*, *Gibraltar*, *Hawke*, *St. George*, *Theseus*.

instead of four. All these ships have done excellent service. Then the protective deck held the field for a period, as mentioned, until the increase of quick-fire guns, especially the small calibre, which might riddle the water-line, again brought the armoured cruiser into favour. The *Cressy* class, six ships of 12,000 tons, mark a great advance in this branch of construction; for the speed is increased from the seventeen knots given to *Narcissus* type to twenty-one knots, and the ten 6-in. guns to twelve; while in addition the *Cressys* carry fourteen 12-pounders. The protection is also more extensive, the belt of 6-in. Krupp steel is carried forward to the stem, and aft to within a short distance of the stern.

These vessels are capable of overhauling and bringing to action nearly all foreign cruisers, but as a few are being constructed abroad of greater speed and power we have responded by the construction of the *Good Hope* class of 14,100 tons and twenty-three knots speed, while the armament is similar to that of the *Cressy* with two additional 6-in. guns.

A variation on the *Good Hope* type is next seen in the *Duke of Edinburgh* and *Black Prince*, mainly as regards armament, for with practically the same displacement the two 9·2-in. guns are increased to six, and the 6-in. guns reduced again to ten. The four additional heavy guns are mounted singly, two on each side, so that an extremely heavy fire, for a cruiser, can be directed on any bearing. Four more of this type, but with the ten 6-in. guns replaced by four 7·5-in. guns, are also under construction, so that we see the tendency also in the armoured cruiser to revert to a few heavy guns.

Cruisers embodying such characteristics as the *Good Hope* and *Duke of Edinburgh* are as costly as any battleship except the largest and latest; but we want many more of



Photo, *Symonds.*

H.M.S. *CRESCENT*, FIRST-CLASS CRUISER.

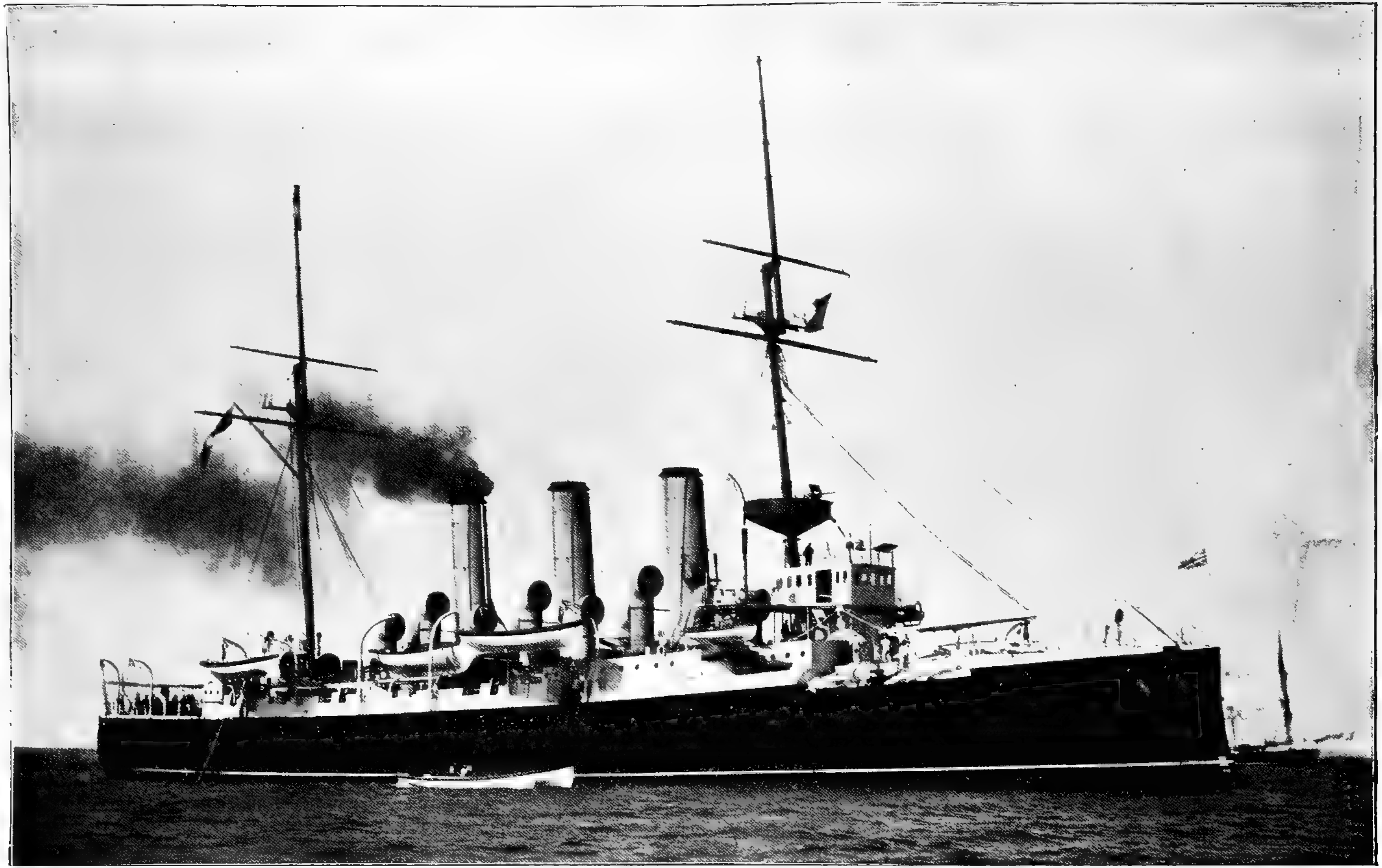
Launched 1892. Of 7,700 tons. Armament: One 9·2-in., twelve 6-in., twenty-six smaller guns. Four torpedo tubes. I.H.P., 12,000. Speed, 19·7 knots. Coal capacity, 850 tons. Crew, 560.

Name of sister ship, *Royal Arthur.*

them. No estimates within our means would suffice for all cruisers to be *Good Hopes*, so we are building sixteen others of somewhat smaller dimensions, six being of 10,850 tons and ten of 9,800 tons. The latter, known as the " County " class, being named after counties of the United Kingdom, have no gun larger than the 6-in., with the peculiarity that a pair of these pieces is mounted at each end as we dispose the heaviest guns of a battleship. The advantages of such a system with this calibre of ordnance is more apparent than real; while the desire to have bow and stern chasers of greater power than the broadside guns has existed for centuries. Hence in the six succeeding vessels known as the *Devonshire* type we have installed at each end a new calibre gun, viz., of 7½-in., which throws a projectile of more than double the weight of that discharged by the 6-in., and one of these guns on each broadside forward, supplementing them with six 6-in. guns. The speed is twenty-two knots as against twenty-three in " County " class. From this brief review it will be seen that we are pushing on with the construction of first-class cruisers.

Though we have sixty built and building, such a number would not suffice for the adequate protection of our commerce as well as for scouting duties with the heavy squadrons. Hence we supplement it with a smaller type called second-class cruisers, varying in size from 3,500 to 5,800 tons, mainly armed with 6-in. guns or a combination of 6-in. and 4·7-in. These have a protective deck instead of external armour, and a speed varying from eighteen to twenty knots.

A smaller type, designated third-class cruisers, should perhaps more correctly be described as despatch vessels, for their dimensions, involving a comparatively small supply of coal, do not enable them to keep the sea for any lengthened period, and their armament is light. Their speed also being less than the large cruisers they are not efficient for scouting



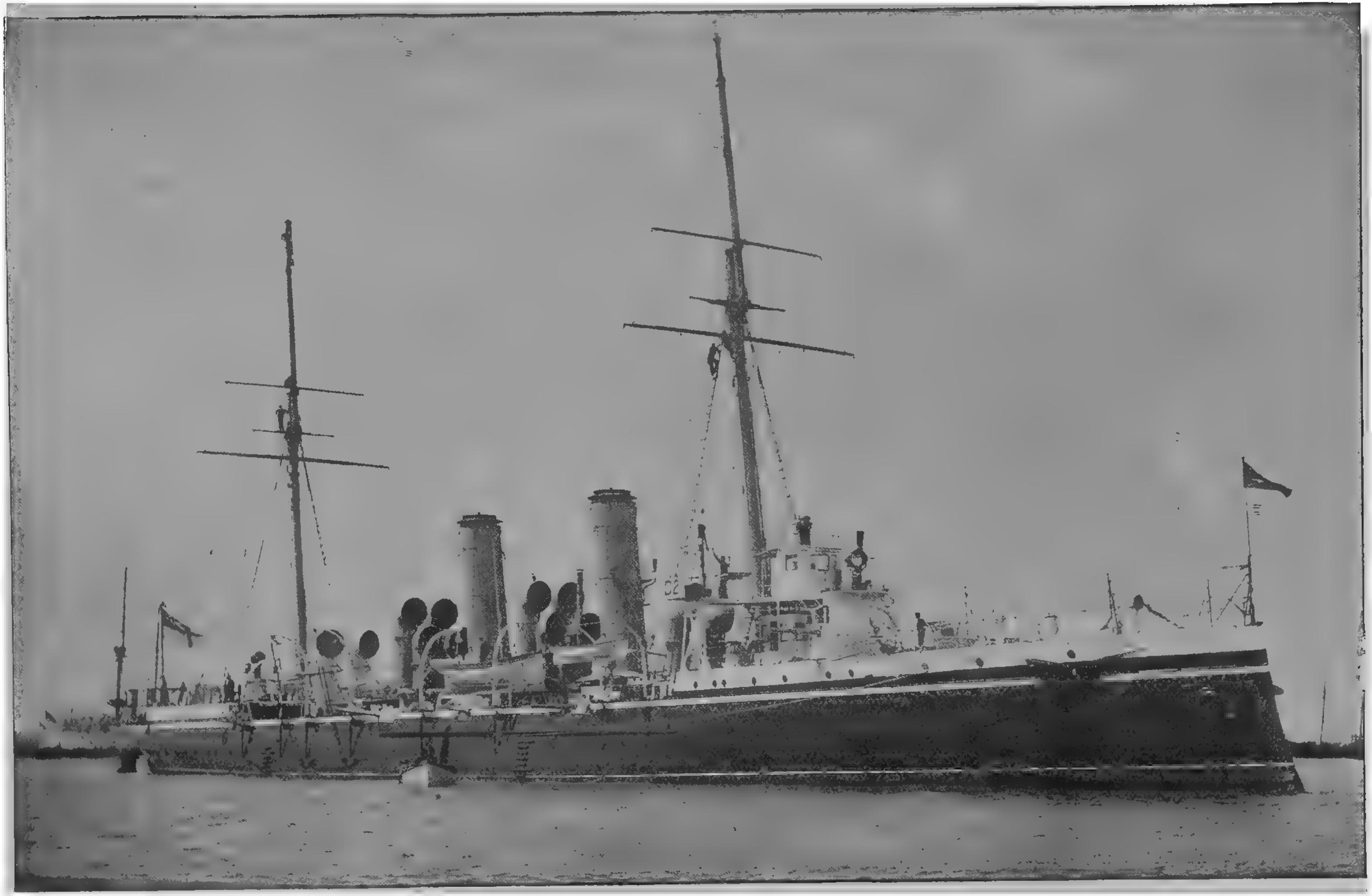
H.M.S. *ARROGANT*, SECOND-CLASS CRUISER. *Photo, West.*

Launched 1896. Of 5,800 tons. Armament: Ten 6-in., nine 12-pdrs., and five smaller guns. Two torpedo tubes. I.H.P., 10,000. Speed, 19 knots. Coal capacity, 500 tons. Crew, 480. Names of sister ships, *Furious*, *Gladiator*, *Vindictive*.

in conjunction with them, nor independently. We are therefore providing a special class of small scouts with very high speed. The *Sentinel*, *Forward*, *Adventure*, *Pathfinder* and others are from 2,500 to 3,000 tons, with a speed of twenty-five knots. To produce this, machinery of 16,000 horse-power is required, and to maintain it for even a short period involves a large consumption of coal. Thus only the lightest armament can be given, consisting of ten 12-pounder guns. Acting as vedettes to gain and convey information they should ordinarily avoid a combat, but are not left defenceless and a prey to the smallest craft, should their motive power fail them. This completes our review of the cruiser fleet, omitting reference to certain less modern ships which yet remain on the effective list.

If we may consider the period from 1840 to 1860 as specially marked by the application of steam to the wooden line-of-battle ship, and the next twenty years by the creation of ironclads and the improvement of ordnance, the final twenty years of the last century will, perhaps, in future be distinguished by the birth and development of the torpedo as a weapon of naval warfare. Whether the expectations formed of its efficiency will be realised is at present an open question, but the fact remains that all nations are now devoting considerable attention to this form of attack, with the no less important question of how fleets can be protected against this new form of naval warfare.

The weakness of ships under water had long been recognised, but the clumsy methods in use for attacking this part before the introduction of the Whitehead torpedo prevented much importance being attached to the matter. It was then seen, however, that the new weapon had great capabilities, and the immense advantage of its application from the smallest craft afloat became fully recognised. A swift boat so armed would be a serious menace to the largest



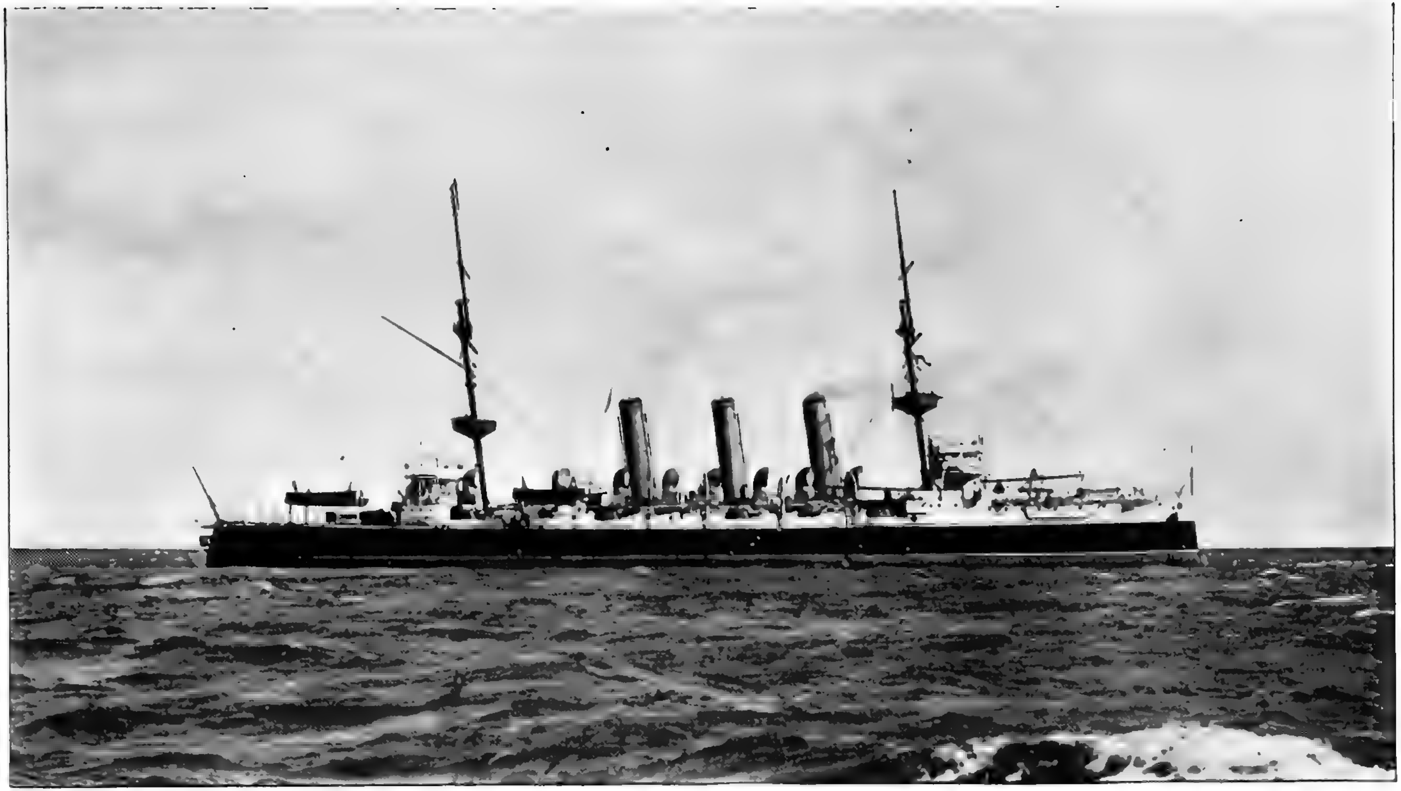
H.M.S. *PELORUS*, THIRD-CLASS CRUISER. *Photo, West*

Launched 1896. Of 2,135 tons. **Armament**: Eight 4-in., ten smaller guns. Two torpedo tubes. I.H.P., 7,000. Speed, 20 knots. Coal capacity, 250 tons. Crew, 224.
Names of sister ships, *Pactolus*, *Pandora*, *Pegasus*, *Perseus*, *Pioneer*, *Pomone*, *Prometheus*, *Psyche*, *Proserpine*, *Pyramus*.

ironclad, finding in rapidity of movement and invisibility defence against the counter attack by guns brought against it. Such considerations brought about that marvellous growth of the torpedo boat which figures so largely in all navies. In England it was not received with so much favour, as being chiefly useful to a State more likely to be acting on the defensive than we could admit to be our probable policy in war. We, nevertheless, have from time to time added batches of these boats to our fleet, and placed a few at all our outlying stations. At the same time it was felt some special means must be devised to meet the torpedo boat, which in the improved form became capable of acting on the offensive, within moderate distance of its base. Such a feeling took practical shape in the "Destroyer," which, in its most recent form, is an enlarged and swifter boat armed with light quick-firing guns, so that it may overtake and destroy the smaller craft before it can execute its mission. This class is represented by the *Havock*, *Hornet*, *Daring*, and many others. Experience has shown they are well suited for narrow waters; and they may be found equally so for such a locality as the Mediterranean, but for ocean work a larger type is desirable. This we have in the torpedo gunboats varying from 550 to 1,000 tons in size. They fell into some disrepute owing to a lack of speed, but this is being remedied by improved boilers. As ocean torpedo-boat destroyers the type deserves further attention.

The latest development of the destroyer is in the increase of speed to 35 knots by the ingenious application of the steam turbine to these craft by Mr. Parsons. This method allows the steam to act direct on the propeller shaft without intermediate cranks, and so permits a considerable increase in the revolution speed of the propeller.

Invisibility being an essential attribute of the torpedo boat for its successful employment it is not surprising that



Photo, Symonds.

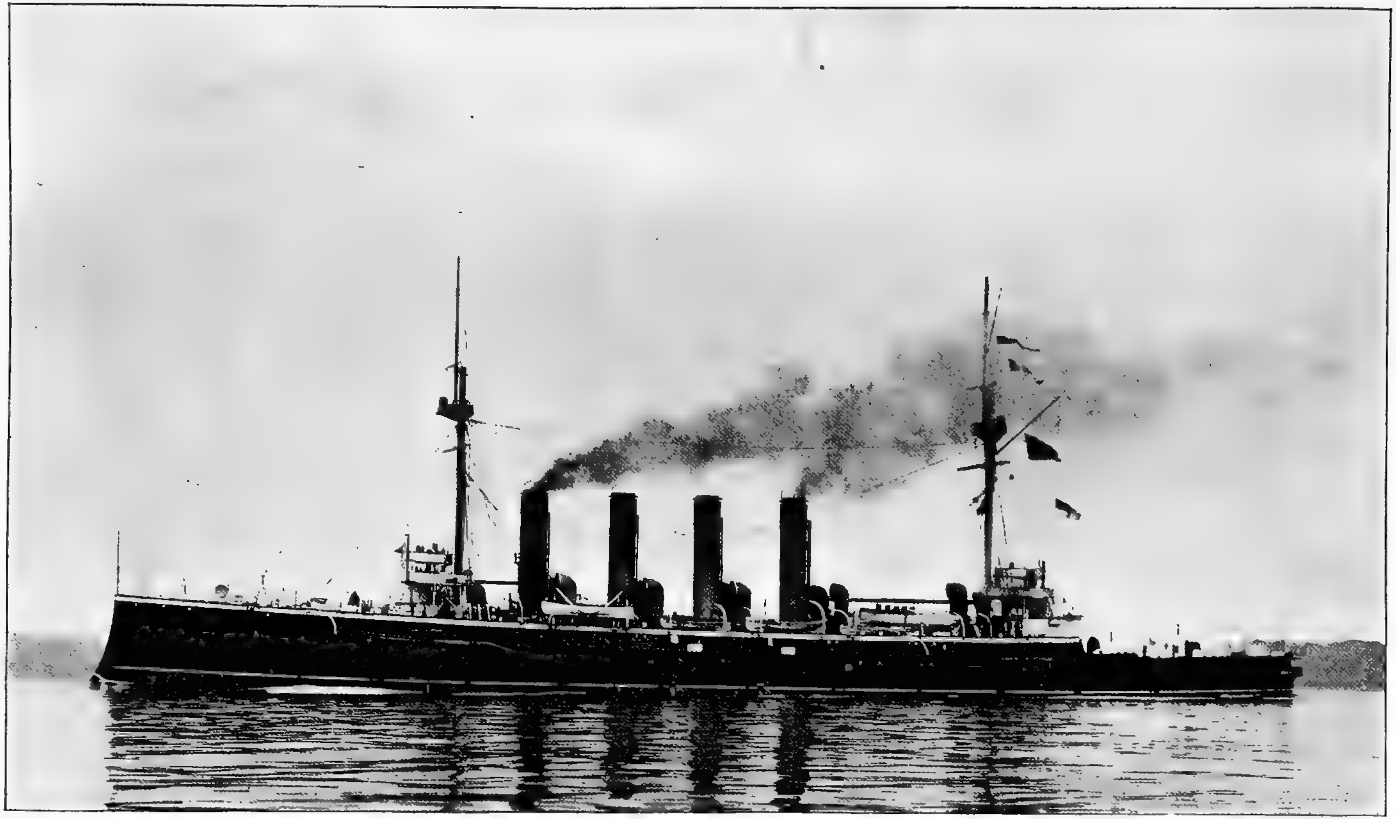
H.M.S. *HIGHFLYER*, SECOND-CLASS CRUISER.

Launched 1898. Of 5,600 tons. Armament: Eleven 6-in., nine 12-pdrs., twelve smaller guns. Two torpedo tubes. I.H.P. 10,000. Speed, 20 knots. Coal capacity, 600 tons. Crew, 477.

Names of sister ships, *Dido*, *Doris*, *Hermes*, *Hyacinth*, *Isis*, *Juno*, *Venus*.

the ancient idea of navigating under water should be revived and receive encouragement to-day. The value of the submarine boat should be estimated by the increased chance it affords of bringing the locomotive torpedo within striking distance unobserved. The torpedo carrier must come within 1,500 yards of its object before becoming deadly, and previous to this the surface boat, being visible, at once comes in for a heavy fire. The submarine boat, on the other hand, need only be on the surface intermittently for correction of its course, and just before discharging its missile. Hence, if other conditions are not averse, the power of disappearing from view undoubtedly aids attaining the desired position. For reconnoitring an enemy's coast or harbours, also, the submarine craft has advantages in its approach being undetected. Many have been the expedients proposed and tried for obtaining a satisfactory submarine vessel. My own experience of them dates back to 1886, when I saw Mr. Nordenfelt's first boat in Greek waters, it having been acquired by that State in anticipation of a war with Turkey. It was propelled by steam, and had in addition to the boiler two reservoirs or tanks of heated water. When required to proceed below the surface the fires were shut off and steam taken from the boiler and tanks. Horizontal propellers forced the boat down to the required depth, overcoming the buoyancy. Thus an unusual peculiarity in these craft was observed of it being more difficult to go down than to come up; for on stopping these propellers the boat at once came to the surface. I should imagine, however, that the heat below would be trying, except, perhaps, to Lascars.

Another boat of which I was asked to witness an exhibition some years ago depended, as regards sinking, upon drawing within the hull projecting hollow cylinders. To rise, these cylinders were pushed out, thus imparting buoyancy by increasing the displacement.



H.M.S. *ARIADNE*, FIRST-CLASS CRUISER. *Photo, Symonds.*

Flagship on the North American and West Indies Station.

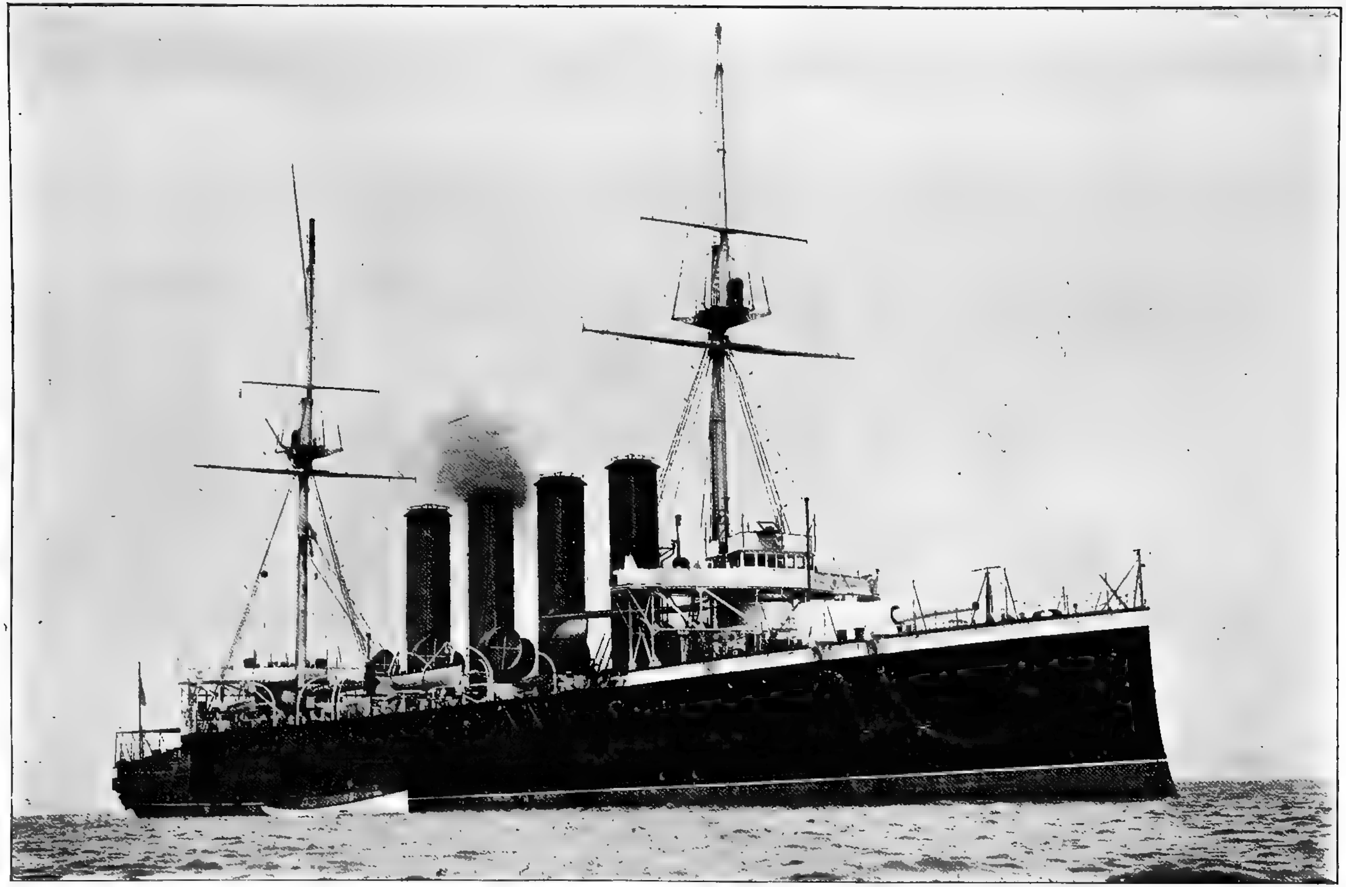
Launched 1898. Of 11,000 tons. Armament: Sixteen 6-in., fourteen 12-pdrs., eleven smaller guns. Three torpedo tubes. I.H.P., 18,000. Speed, 20·7 knots. Coal capacity, 1,000 tons. Crew, 677.

Names of sister ships, ***Andromeda, Amphitrite, Argonaut, Diadem, Europa, Niobe, Spartiate.***

The trial of this craft took place in Tilbury Dock, and when some of the party had got inside through the manhole this was closed, the cylinders drawn in, and the submarine disappeared from our gaze. What happened is then thus narrated. After a short time below, the craft being stationary and resting on the bottom of the dock, the word went forth to out cylinders and ascend. The projection was effected by winches. To the horror of the crew it was then found that these could not be moved. What had been up to then a light-hearted task now assumed a serious aspect; the air was becoming exhausted. It was a case of off coats and heave round for life. What had happened? Simply they had not reckoned upon two or three feet of soft mud at the bottom of the dock in which the submarine had made a comfortable bed, the soft material resting against the outer faces of the cylinders and resisting projection. Fortunately, after some moments of anxiety the force put forth displaced the mud, and the vessel rose to the surface. Not until the inmates were released did we above know of the *mauvais quart d'heure* they had passed. Whether this incident affected the future of the invention I know not, but it does not appear to have made material progress since.

In America and France, after much experimenting practical submarine vessels were produced. As in the case of the torpedo boats we were slow in following suit; but the desire to know the actual value and the best way of counteracting them led us to obtain some submarine boats. The earliest patterns are of 120 tons displacement, later constructions are of 200 tons. They are capable of travelling on the surface by means of an engine operated by gasoline; when under water propulsion is effected by electricity supplied from accumulators.

The original submarines had usually only one system of propulsion suitable for them when hermetically sealed and



Photo, Symonds

H.M.S. *CRESSY*, ARMOURED CRUISER.

Launched 1899. Of 12,000 tons. Armament: Two 9·2-in., twelve 6-in., twelve 12-pdrs., thirteen smaller guns. Two torpedo tubes. I.H.P., 21,000. Speed, 21 knots. Coal capacity, $\frac{800}{1600}$ tons. Crew, 755.

Names of sister ships, *Aboukir*, *Bacchante*, *Euryalus*, *Hogue*, *Sutlej*.

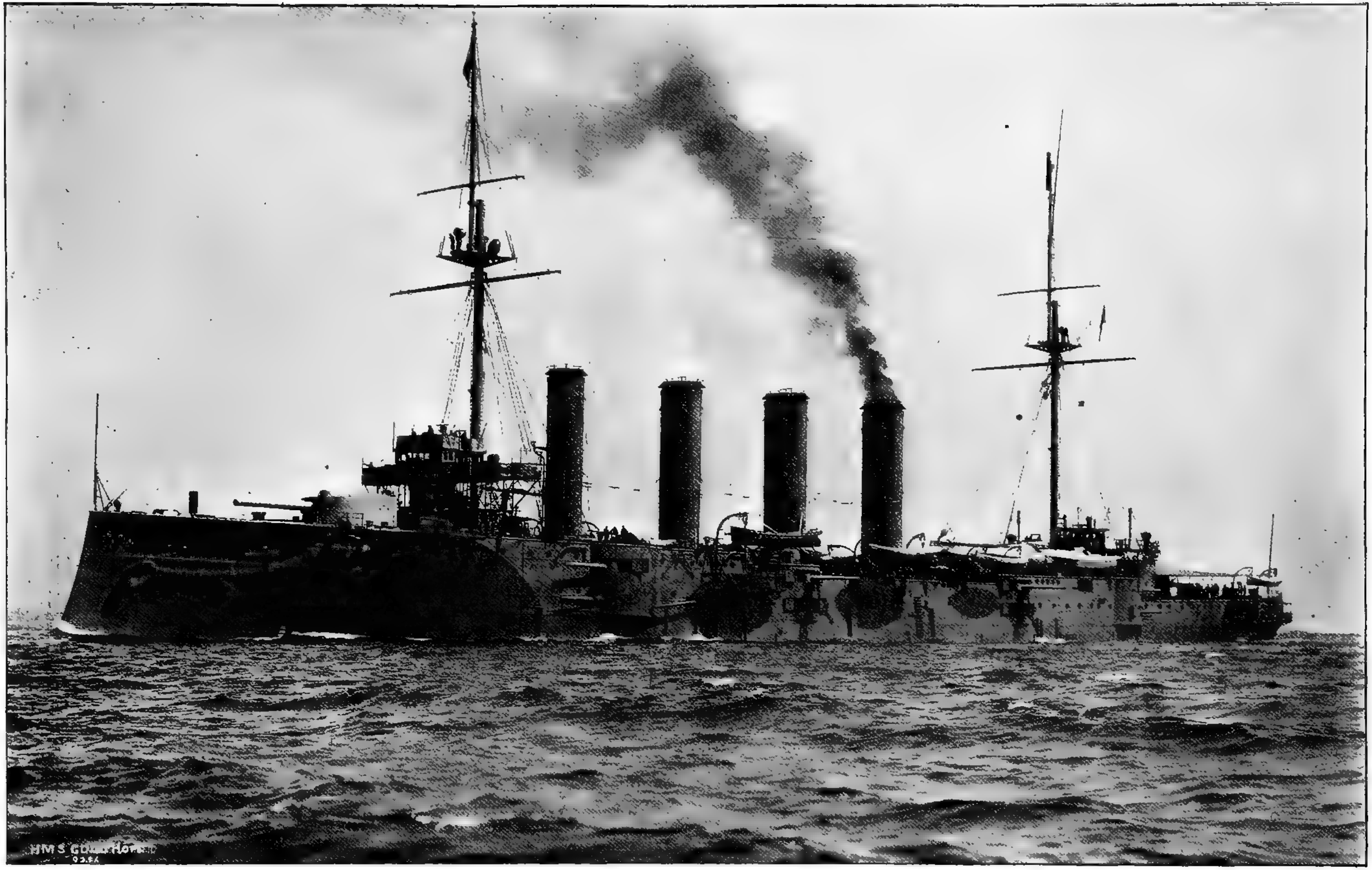
travelling under water, or just awash. But whether the power was compressed air or electricity the storage of either was so limited as to circumscribe greatly the boat's range of operation. Hence the surface propulsion in addition, and with it the craft is termed submersible. The time within which it can pass from one condition to the other is a measure of its efficiency, so as to be under observation or fire the shortest possible period. The chief defect of a submersible craft is the limited range of observation from it when on the surface—owing to absence of elevation of the observer—and entire invisibility, when submerged, of objects distant more than a few feet, owing to the darkness which prevails under water. To give some knowledge, when in this condition, of objects in the vicinity above, an instrument called a periscope has been devised, which is a tube going from the boat to the surface, through which objects are reflected below on to a table. Such a device, with the limiting conditions of application at sea, can be, however, but an imperfect medium for conveying the information desired, and upon which so much depends.*

The torpedo boat being primarily for the defence of harbours the submarine vessel adds to the risk of closely blockading a port. It does not necessarily entail this operation being abandoned; but may cause the heavy ships to keep further out, leaving the close guard, as before, to be maintained by a light flotilla. So far there seems no reason to believe the submarine will displace the ironclad in naval warfare.

Finally, it may be asked, Has the under water attack a future, or will it eventually disappear, like the fireship? To give a direct answer is difficult, but an opinion may be formed from the following. The torpedo is directed against the most vulnerable part of a ship, and one successful hit in

---

* The sad accident to Submarine A1 seems to confirm the difficulty of obtaining an all round view.



Photo, Symonds.

H.M.S. *GOOD HOPE*, ARMOURED CRUISER.

Launched 1901. Of 14,100 tons. Armament: Two 9·2-in., sixteen 6-in., fourteen 12-pdrs., twelve smaller guns. Two torpedo tubes. I.H.P., 31,000. Speed, 23 knots. Coal capacity, $\frac{1250}{2500}$ tons. Crew, 900.

Names of sister ships, *Drake*, *Leviathan*, *King Alfred*.

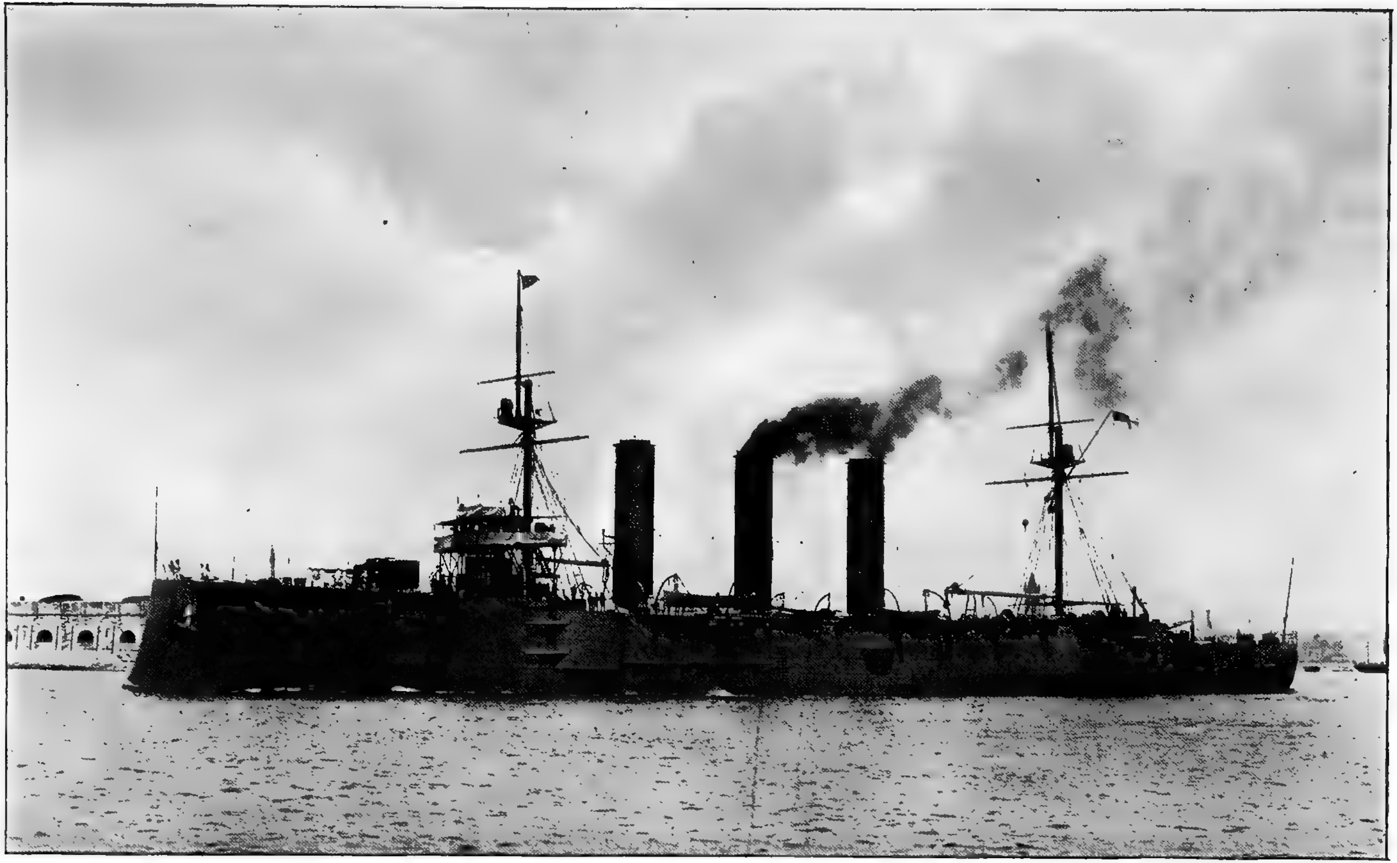
any part most probably would, if it did not sink, so disable her as to put any offensive action out of the question. We cannot defend the hull under water with armour, as we do above, against shot and shell, as great buoyancy is required to carry the heavy weights a fighting ship requires. Subdivision into watertight compartments can only be carried out to a certain extent, and there must remain large spaces which cannot under existing conditions be subdivided. When all is done in this direction an increase in the charge of the torpedo, an easy matter, gives it again the mastery.

A few years ago the low speed and inaccuracy of this weapon seriously impaired its efficiency. To-day, owing to increased velocity, and above all from the greater accuracy secured by applying the gyroscope to its movement, efficiency has been increased one hundredfold. There remains only now to add further to speed and reduce the time of reaching an object; for if the torpedo takes nearly a minute to traverse 1,000 yards several conditions have time to come into play to produce a miss. Nevertheless I believe that in the next naval war between two first class maritime Powers the locomotive torpedo is destined to produce some such revolution in construction as the introduction of shell fire effected over forty years ago.*

Such have been the changes in warships since the old wars, and the most striking have occurred during Her late Majesty's eventful reign. They are associated with the names of many distinguished men as the product of nautical experience and able design. If at one time behind other nations in naval architecture, we have held the lead since iron and steam became the principal factors in construction and propulsion. Isaac Watts, the designer of the *Warrior*, deserves to be remembered with Brunel, who evolved the *Great Eastern* from his prolific brain. Sir E. J. Reed, Sir Nathaniel

---

* In the Far East the torpedo up to now has played the principal part in the naval operations.



H.M.S. *KENT*, ARMOURED CRUISER.

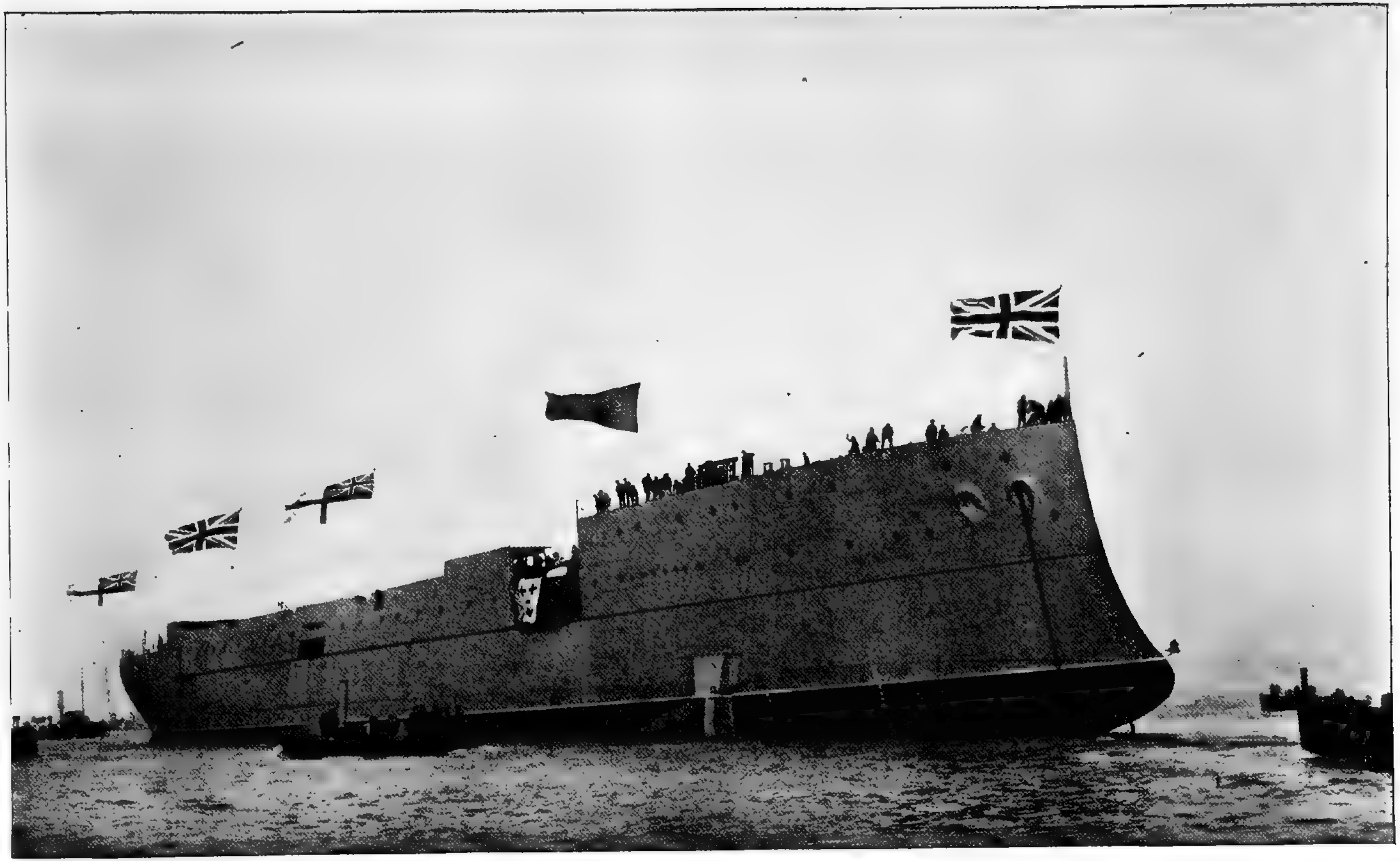
Photo, Symonds.

Launched 1901. Of 9,800 tons. Armament: Fourteen 6-in., eight 12-pdrs., thirteen smaller guns. Two torpedo tubes. I.H.P., 22,249. Speed, 23 knots. Coal capacity, $\frac{800}{1600}$ tons. Crew, 500.

Names of sister ships, *Bedford*, *Berwick*, *Cornwall*, *Cumberland*, *Donegal*, *Essex*, *Lancaster*, *Monmouth*, *Suffolk*.

Barnaby, Sir William White, and Mr. Philip Watts have each helped to create the fleet which has maintained our supremacy at sea for the last forty years. Nor should it be forgotten how much has been done outside the Navy to forward its efficiency, and how greatly our position as a maritime Power is enhanced by those splendid private shipbuilding establishments, the envy of other States. The names of Armstrong and Noble must always be connected with the progress of ordnance, those of Maudslay and Humphreys with those beautiful marine engines which other fleets besides our own are glad to secure. Thornycroft, Yarrow, and Parsons are now household words in connection with those wonderful constructions which flash past at the speed of an express train. Messrs. Whitehead and Brotherhood have given us a wonderful under-water missile.

The country owes much to all these men.



Photo, Johnson & Logan.

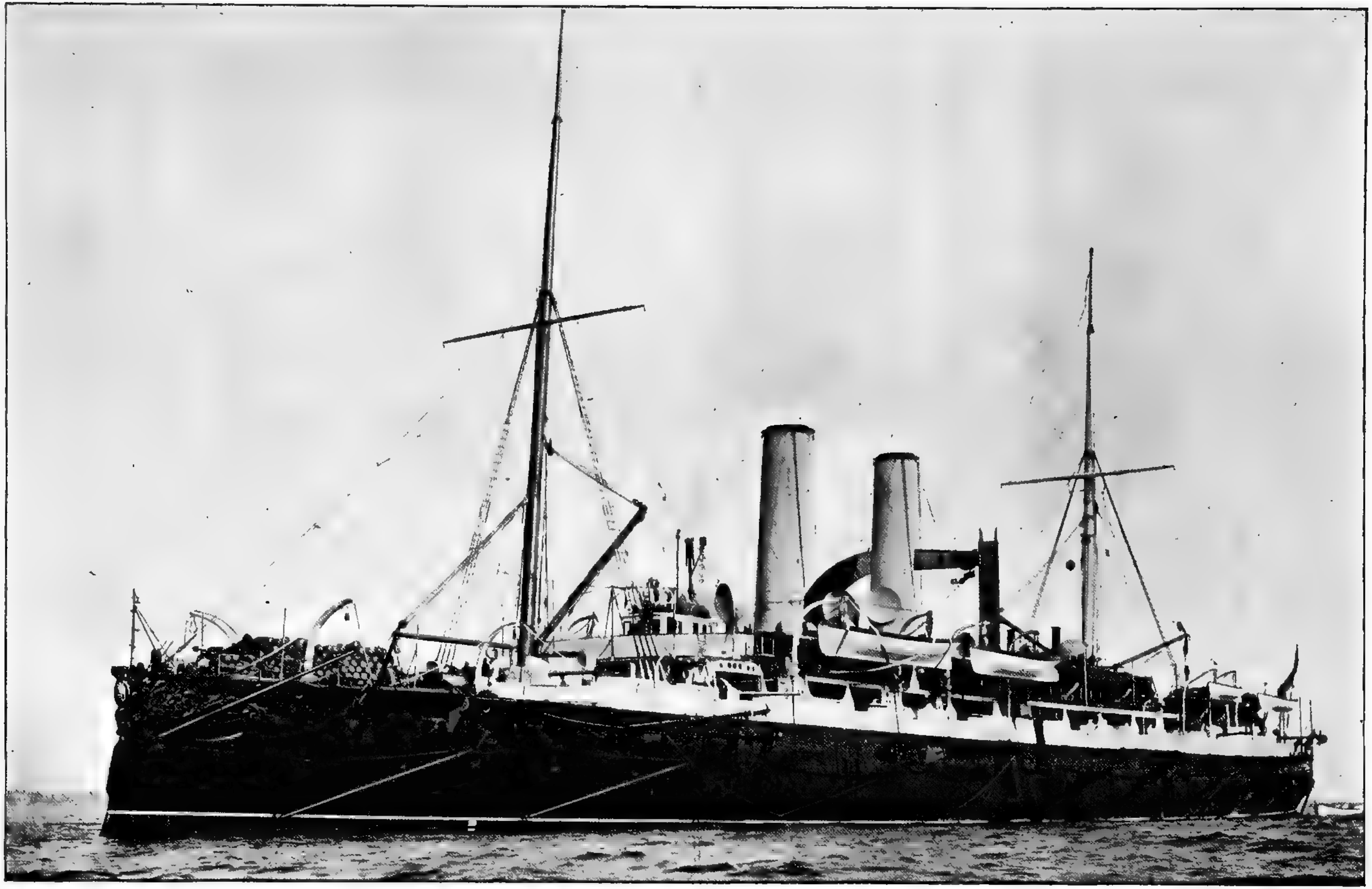
LAUNCH OF H.M.S. *SUFFOLK*, ARMOURED CRUISER, AT PORTSMOUTH, JANUARY 15, 1903.

V.

MANNING.

No description of the British Fleet would be complete without some account of how it is manned and trained, but in view of the great changes in training recently made some preliminary remarks are necessary.

From earliest days seamanship has been the art of moving a craft on the water from one place to another, be the distance between them small or great. First the coracle or canoe, impelled by the paddle, limited to rivers and the coast; next the boat, with greater capacity, speed and seaworthiness, propelled by oars, which attained its greatest development in the galley; and then the sailing ship, using the power of the wind to move the vessel to any desired point or part of the world. The skilful seaman was in all cases he who had the best knowledge of the means which propelled his craft and placed her where he desired. The early mariners used this art for trade or fishing, but were not trained for war—that is, in the use of weapons; so that when trading vessels were taken for naval warfare it became necessary to put on board men skilled to arms, and thus practically soldiers were embarked for the fighting work. The duty of the mariners was to move the vessel and put her near or alongside the enemy, when the soldiers plied their crossbows and other weapons of that time. Thus there were two distinct classes, which continued in some form or other for many years; one which propelled the ship and the other which fought her, the latter being superior. The inconvenience of a system under which, if there were any casualties in action among the soldiers, the mariners were of



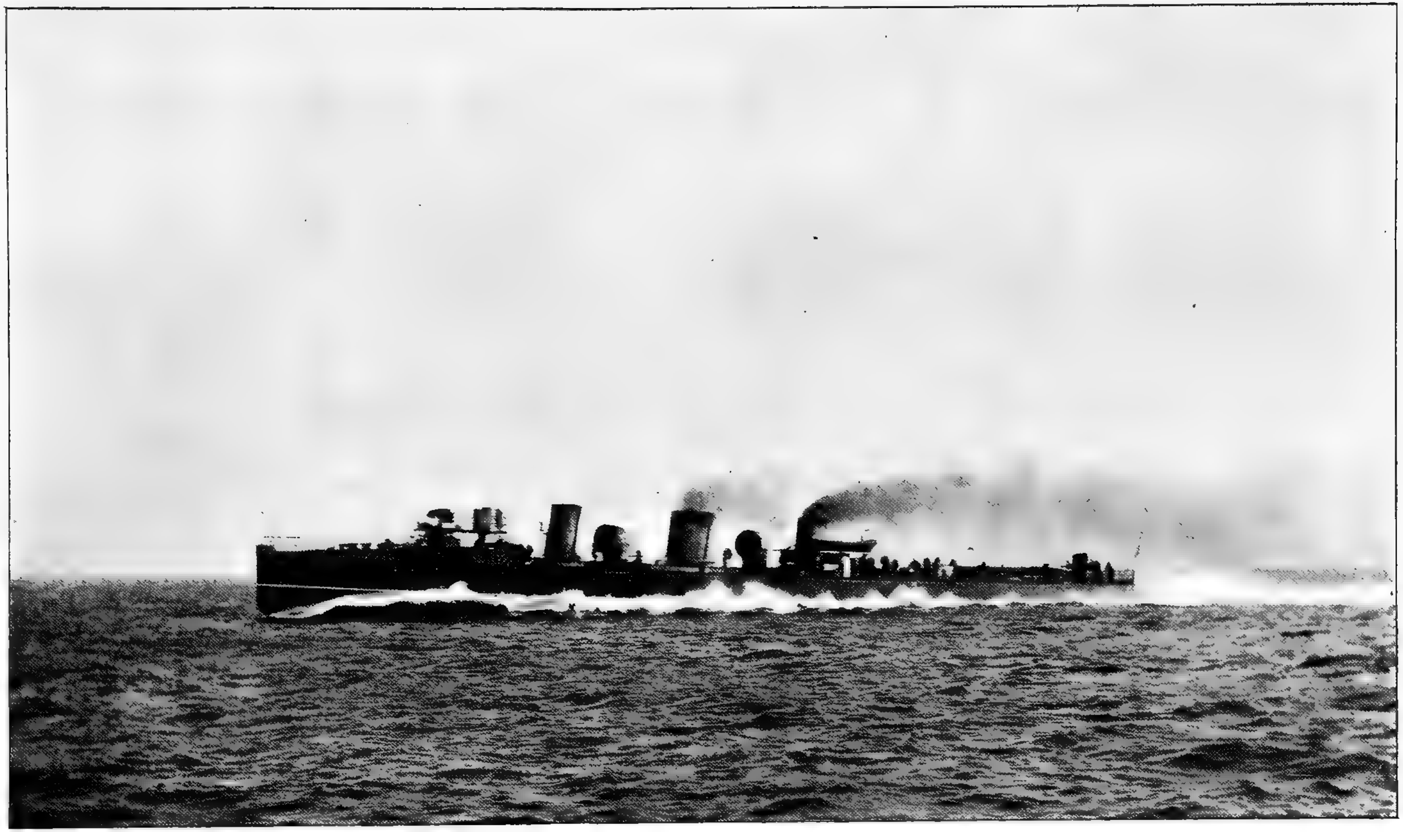
H.M.S. *VULCAN*, TORPEDO DEPÔT SHIP ON THE MEDITERRANEAN STATION. *Photo, Symonds.*

Launched 1889. Of 6,620 tons. Armament: Eight 4·7-in., twenty-eight smaller guns. I.H.P. 12,000. Speed, 20 knots. Coal capacity, 1,000 tons. Crew, 433.

little assistance for fighting, while if the sailors suffered great loss the fighting men could not handle the ship, in time became evident, and one class resulted, which was equally at home with the power of propulsion as with the weapons. Presumably it was found easier to teach the sailor to be a gunner than to train the soldier to go aloft and handle the ship. From that time up to the advent of steam the skilled seaman was one who knew how to propel his ship and fight the weapons with which she was armed. Moreover, he prided himself most on his knowledge of the first. Gunnery held a secondary place in his regard.

When steam was first applied to the propulsion of ships, it having been for some time in use on shore, it became necessary to enter men accustomed to engines and boilers for this work afloat. Steam was combined with masts and yards, and was looked upon with disfavour by the sailors. The engineers, as they were termed, therefore, were given an inferior place in the hierarchy of the sea. In fact, the engineer officers at first ranked only with warrant officers. Naval men of that day did not, or would not, foresee steam had come to stay, and no efforts were made to graft this new method of propulsion on the training of the combatant officers and seamen. As this new power became more important and took a greater share of the operations of a fighting ship the persons who were trained to it gradually became more influential and took a more leading part in the work of the Navy. The engineers and stokers were not trained to the use of weapons, while the seamen were not taught the work of propulsion. Thus we gradually reverted to the old system by which two classes were maintained, one for the fighting and the other for the propulsion, with the same inconvenience that in an action should there be heavy casualties in either of these branches it could not be reinforced by the other.

Sail power having now disappeared from fighting ships,



From Photo kindly presented to the Navy League *by the Parsons Marine Steam Turbine Co., Limited.*

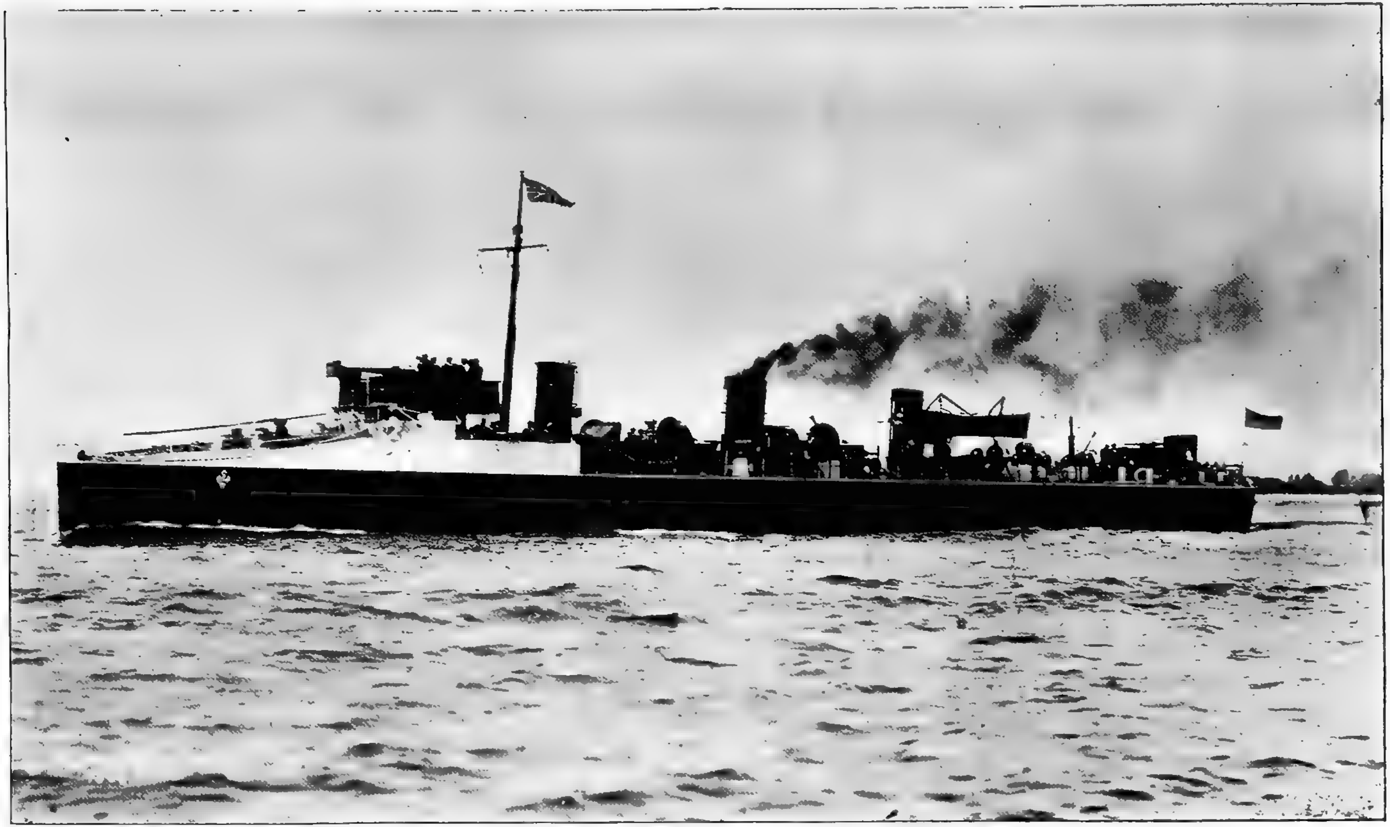
H.M.S. *VIPER*, TURBINE TORPEDO-BOAT DESTROYER, STEAMING 35½ KNOTS, AFTERWARDS WRECKED.

Launched 1899. Of 312 tons. Armament: One 12-pdr., five 6-pdrs. Two torpedo tubes. I.H.P., 6,500. Speed, 35½ knots. Coal capacity, 88 tons. Crew, 62.

steam power has become the profession of the sailor, and it is necessary that the seamen, as of old, should be equally proficient with the means by which the ship is propelled and fought. We thus arrive at the same point, whether the man acquainted with the machinery should be taught the weapons or the fighting man the machinery. It is desirable that the latter should prevail, and the new scheme of training is the first step towards this end.

As long as masts and sails existed it was necessary to train seamen in their use, and at that time it would perhaps have been difficult in the time that could be given to training to have made him proficient in the other form of propulsion as well, but sail power having disappeared there is no reason why the use of machinery should not now become an essential part of his training. The same applies to the officer. The most skilful captain of old was he who handled his ship best with the propulsion power in use. He had an intimate knowledge of it in all the attributes appertaining to the seaman's art, and he must have to-day the same intimacy which will enable him not only to place his ship where it is desired she may go, but also to sustain her against the effects of the elements, as well as of the enemy. This is now recognised, and officers as well as seamen are being taught the use and manipulation of machinery.

The seamen are recruited from boys who enter between the ages of fifteen and sixteen and a half years. They go to training ships for about two years, and are then drafted into the fleet, having engaged to serve for twelve years. At the end of that period they can leave or re-engage for another period of ten years. The majority choose the latter course, with a view to obtaining the pension which then becomes due. The regulations for training will be so arranged that in future an able seaman before receiving his rating as such must possess some mechanical knowledge and a fair knowledge of the simpler duties of the stokehold. This system provides a



H.M.S. *VIOLET*, TORPEDO-BOAT DESTROYER. *Photo, Symonds.*

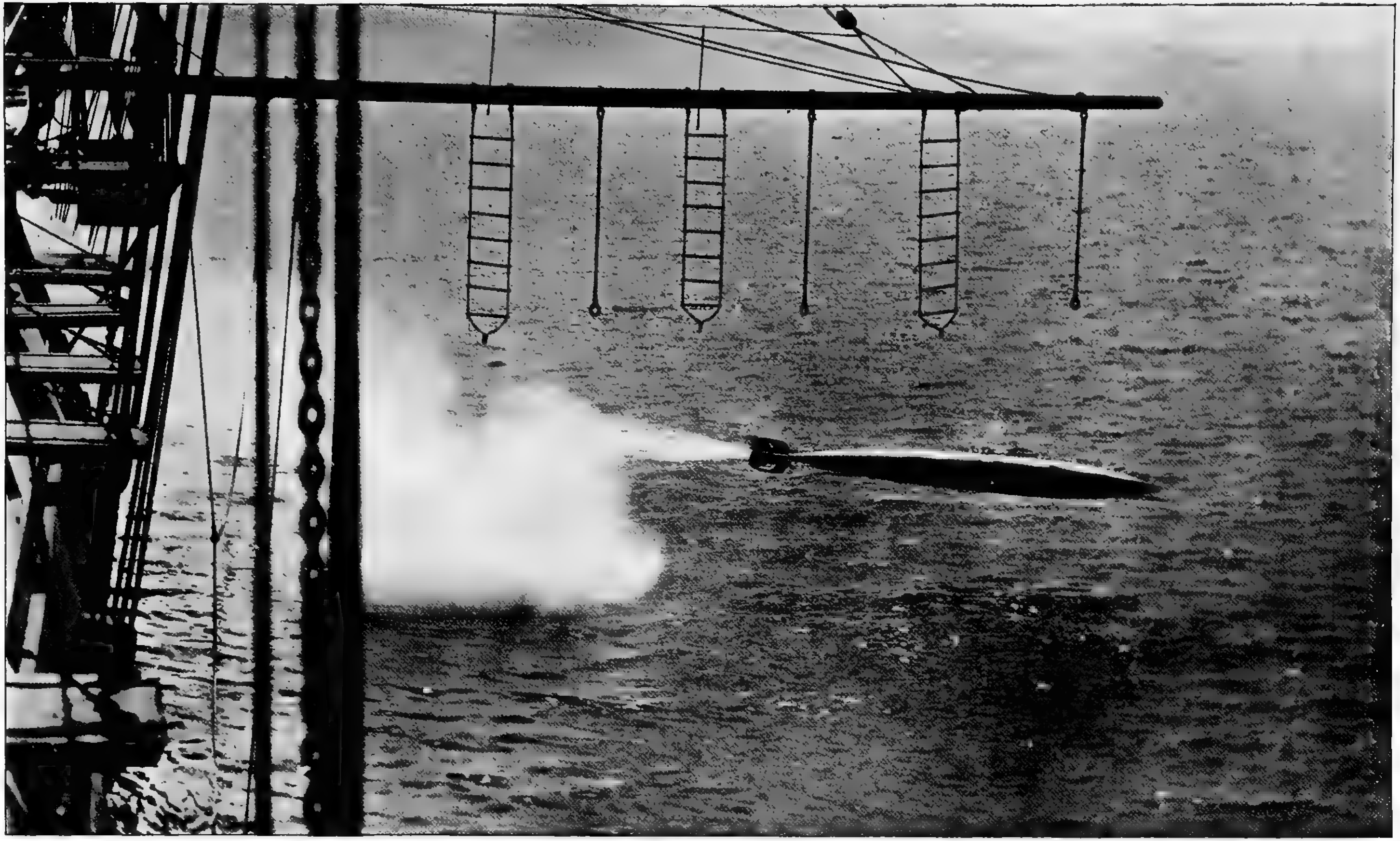
Launched 1901. Of 283 tons. Armament: One 12-pdr., five 6-pdrs. Two torpedo tubes. I.H.P., 5,400. Speed, 30 knots. Coal capacity, 80 tons. Crew 58.

highly trained and efficient force of seamen, which can be increased in numbers by taking more boys annually; and such are the advantages of the Navy that the supply is always greater than the demand. All ships also carry a certain number of marines, who are recruited at a later age, and, after being trained and disciplined in barracks, embark, and so obtain that sea experience which gives the value to this force as an adjunct to the Navy. Their length and conditions of service are the same as for seamen.

The weak point of any long service system is that it does not provide a reserve. To obtain this the British Navy has hitherto relied on the mercantile marine, the State giving a certain number of merchant seamen an annual retaining fee, in return for which they perform annually so many days' drill, and engage to join the Navy when required for war or an emergency. That these men have not actually served in the Royal Navy is a defect we are seeking to remedy by embarking them for short periods, but from this source only a comparatively small number can be obtained. Hence we are forming a special reserve from men who leave the Navy after their first period of service, and also from those who complete their time for pension.

For practically one hundred years officers for the sea service have joined between the ages of twelve and fifteen. It was considered necessary they should become as early as possible associated with discipline and the somewhat unnatural conditions of a sea life. Placed thus young in positions of responsibility, they acquire a confidence which is a great help in after years and gives early experience which is most useful.

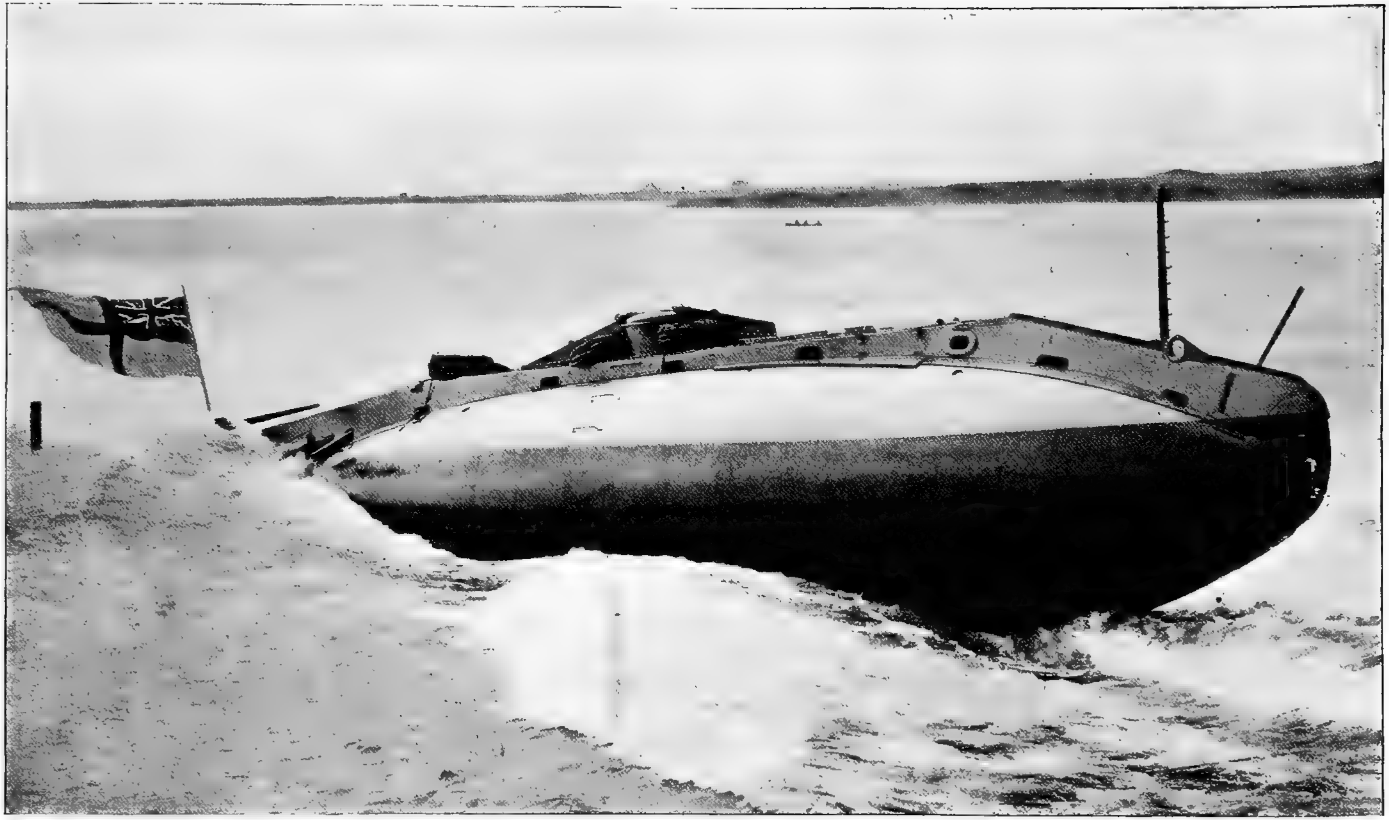
Previous to 1859 young officers went straight to sea, but in that year a harbour training ship for them—the *Britannia*—was established, and has continued ever since. The time under instruction on board this usually lasted two years, being partly scholastic, partly technical. On joining the fleet



FIRING A WHITEHEAD TORPEDO. *Photo, West.*

at the average age of sixteen, their education was continued by naval instructors until the midshipman passed for lieutenant at the age of nineteen, and then received the rank of sub-lieutenant. Promotion comes in about two years. The difficulty of carrying out efficiently the work of a school amidst the routine of a ship and squadron, and the advantage of a boy being well grounded in his general education before it is diverted in a special direction, has led some officers to advocate that midshipmen should not go to sea until the age of eighteen or nineteen. This I do not think desirable, as the sea is a calling which must be assimilated at an early age, and the duties of a midshipman between the ages of seventeen and nineteen inculcate habits of discipline and bring responsibility, which are invaluable hereafter.

Under the new scheme, however, important modifications in the entry and training of naval officers have been introduced. Besides those who become lieutenants and captains, two other branches—the engineer and marine officer—take an important share in the conduct and fighting of a warship. They, up to now, entered under different conditions of age and service, while their training diverged materially from that of the midshipman. To the inconvenience of this allusion has been made. In future all will join under the same conditions, and their training up to a certain point will be uniform. The age of entry will be from twelve to thirteen, and in view of the inadequate accommodation afforded by, and other defects incidental to, a hulk, the *Britannia* is to be replaced by a college on shore at Dartmouth, now under construction. Another similar establishment has been created at Osborne, in the Isle of Wight. The period of training in these two establishments will be four years, during which time not only will the students' scholastic education be continued, but they will also learn the rudiments of navigation and marine engineering, for which workshops and training vessels are provided. They



By kind permission of the *"Navy and Army Illustrated."*

LAUNCH OF A BRITISH SUBMARINE BOAT

Built by Messrs. Vickers, Maxim & Co., Barrow.

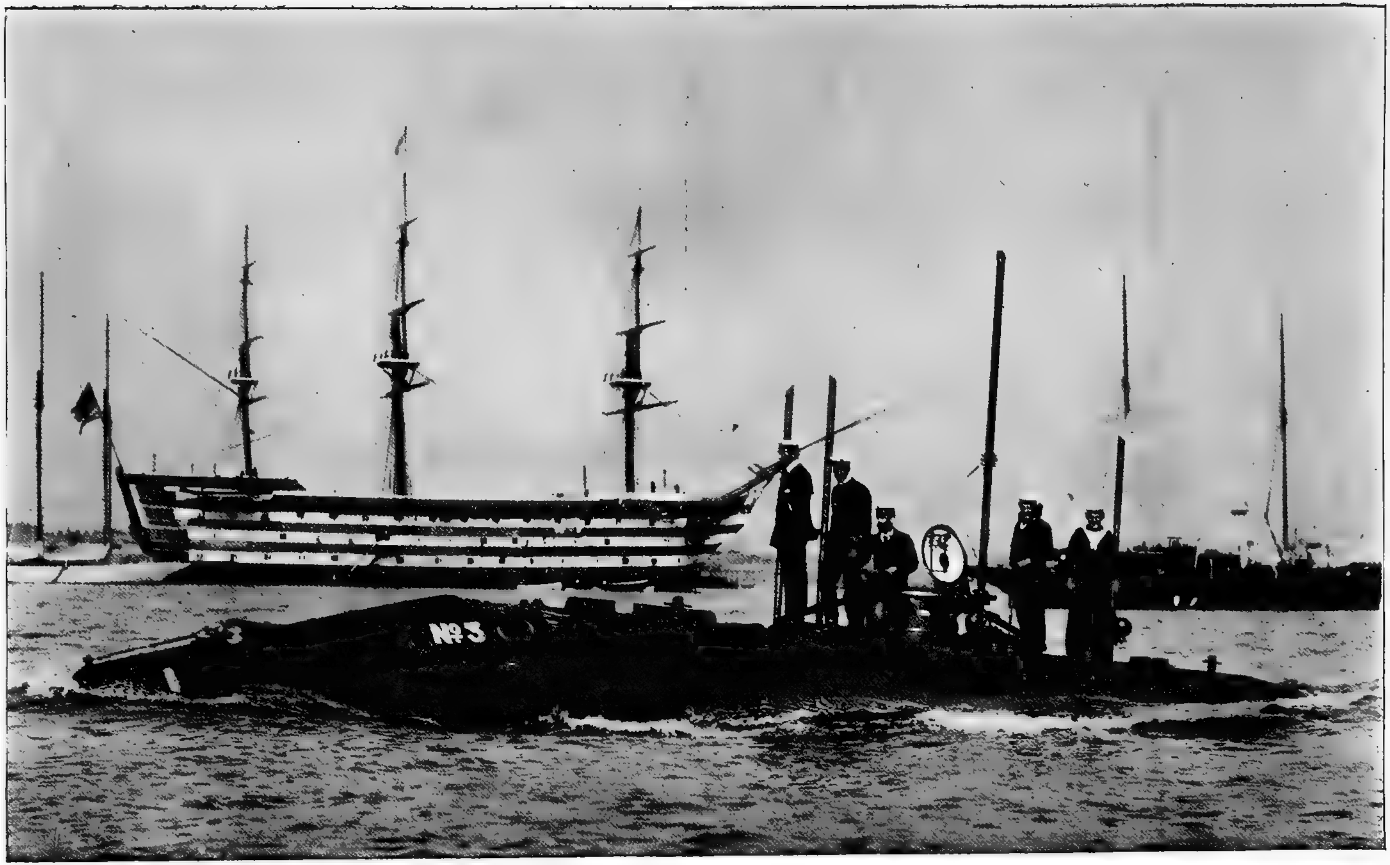
Launched 1902. Displacement, 120 tons. One torpedo tube. Four Whitehead torpedoes carried. Length, 63⅓ ft. Breadth, 11¾ ft. Speed, 8 knots awash. I.H.P., 190.

will then go to sea between the ages of sixteen or seventeen, either in the regular fleet or special sea-going ships. In either case their training will be continued for another three years, when, after passing an examination, the midshipman becomes an acting sub-lieutenant. To be confirmed in this rank he then has to undergo courses of instruction in navigation and gunnery at the Naval College, Greenwich, and the Gunnery School, Portsmouth. Specialisation in engineering, navigation, gunnery, torpedo, and the duties of a marine officer are then taken up, according to the bent of individual officers and the requirements of the service.

Thus we obtain a homogeneous body of officers coming, as it were, from one great public school, and receiving the same general training before branching off to the advanced subjects, as in ordinary life, men, after college or university training, adopt different professions or investigate that branch of physical science which most appeals to them.

The following estimate may be considered approximately the number of seamen (including engine-room complements, mechanics, etc.), marines and boys required for all effective ships built and building, as also for auxiliary services in case of a general mobilisation for war:

1st class battleships	(61)	43,400
2nd ,, ,,	(4)	2,500
3rd ,, ,,	(2)	1,100
Coast defence ironclads	(2)	600
1st class cruisers	(62)	42,000
2nd ,, ,,	(52)	18,200
3rd ,, ,,	(44)	3,800
Scouts	(8)	1,600
Torpedo depôt and store ships	(3)	750
Torpedo gunboats	(31)	2,800
,, destroyers	(160)	8,100
,, boats	(109)	3,270
Auxiliary cruisers, store ships, etc.	(50)	5,000
Harbour duties, guard boats, etc.		5,000
	Total required	138,120



Photo, West.

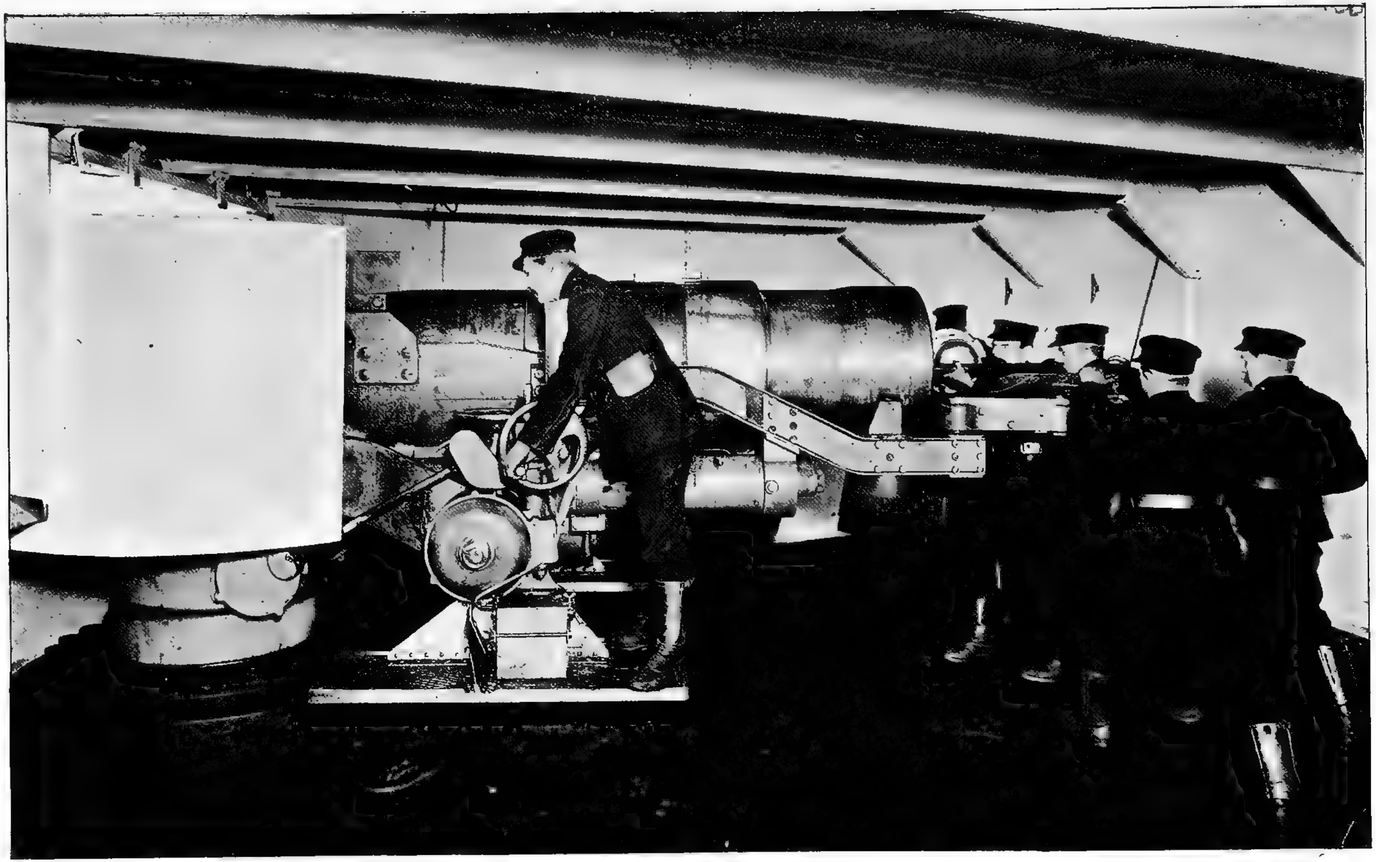
1805 *VERSUS* 1903.

Our resources for meeting such a demand are as follows:

Petty officers, seamen, mechanics, etc., and boys	86,700
Marines	19,000
Coastguard	4,000
Active service—Total ...	109,700
RESERVE.	
Reserve, all classes...	40,600
Boys under training	6,000
Total available resources ...	156,300
Deduction for sick, ineffective, etc.	3,300
Total effective resources ...	153,000
Total requirements	138,120
Surplus ...	14,880

This surplus would soon be absorbed filling up casualties, etc., in war time. It is evident that a reserve of 40,600 is inadequate, and steps are being taken to supplement this number. As regards officers, we should require for the same services 220 captains, 240 commanders, and 1,500 lieutenants. We have 520 captains and commanders, so are not short in these ranks. As regards lieutenants and sub-lieutenants, our number of these combined is 1,840, which would be sufficient for mobilisation by utilising retired officers and officers of the Naval Reserve.

Finally, we are adding to our resources for manning by the re-introduction of Naval Volunteers. Divisions of these are being formed at all the chief mercantile ports. Aided by a capitation grant and guns for training, they engage to join the Navy when required and serve wherever the Admiralty desire. They will form also a useful connecting link between the regular forces and the civilian population.



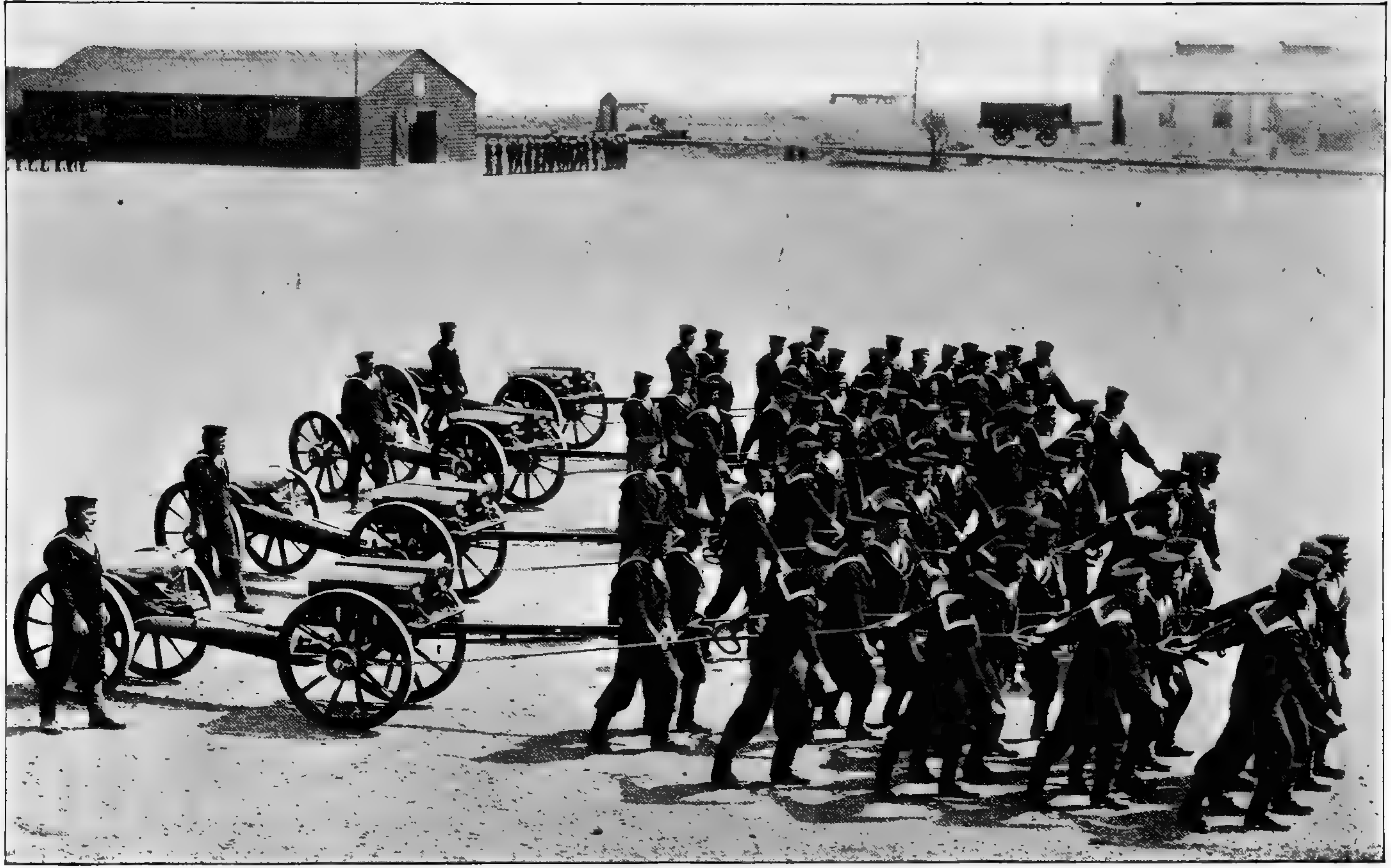
By kind permission of Messrs. Vickers, Sons & Maxim.

LOADING 7·5-IN. GUN, H.M.S. *TRIUMPH.*

VI.

ADMINISTRATION.

The British Navy is administered by a Board of Admiralty, the members of which are Commissioners for executing the office of Lord High Admiral. It is a delegated power, for the guardianship of the seas, and, as a consequence, the command of the naval forces, are by common law vested in the Crown. The first mention of an Admiral in our records is that of Sir John de Beauchamp in the reign of Edward III., and of a High Admiral about 1426, after which the succession of Lords High Admiral remained unbroken until 1628. Henry VIII. established a Navy Board, who were ordered to meet weekly on Tower Hill and report their proceedings once a month to the Lord High Admiral. This Board continued, with some modifications, until it was abolished in 1832. It dealt with what were called the civil affairs of the Navy. In 1628 the office of Lord High Admiral was for the first time placed in commission, the Commissioners being the great officers of State. Charles II., later, made the Duke of York Lord High Admiral, but in the first year of the reign of William and Mary the office was again put in commission, with Admiral Arthur Herbert (created Lord Torrington) as head. Once or twice afterwards a Lord High Admiral was appointed, the last occasion being when the Duke of Clarence (afterwards King William IV.) was appointed in 1827; but he resigned the next year, owing to some difference with the Duke of Wellington on a question of travelling expenses, since which time the office has remained



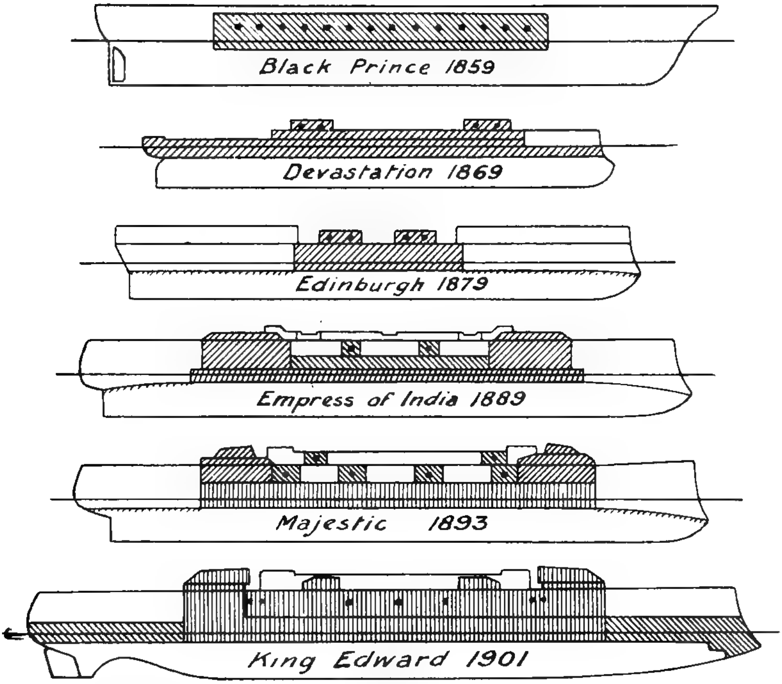
LANDING PARTY WITH FIELD GUNS.

Photo, West & Son, Southsea.

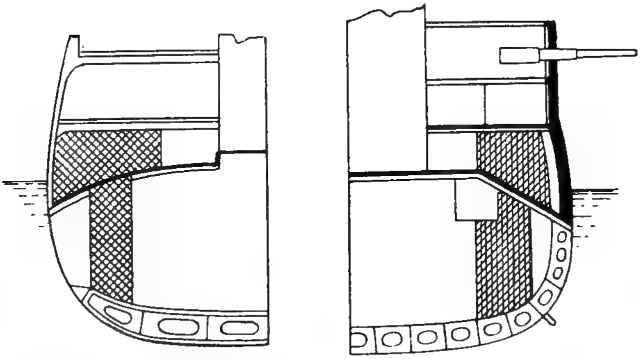
These guns are the obsolete 9-pdr. muzzle-loaders still carried in many of our ships, and not the long 12-pdrs. used at Ladysmith.

in commission. The head of the Board is a Cabinet Minister under the official title of First Lord of the Admiralty. Formerly this minister was frequently a naval officer, but for many years a civilian has been selected. His want of technical knowledge is remedied by giving him naval colleagues, the senior of whom acts as his principal naval adviser. He is called the Senior Naval Lord. It has long been a matter for argument whether the First Lord of the Admiralty should be a naval officer or a civilian. There is much to be said on both sides, but I think naval opinion generally is in favour of the civilian. He comes to the office unbiassed in favour of any particular phase of construction or of individual officers. He has no followers. He has usually some experience of departmental work. It is difficult to find a naval officer with all the special qualifications required. Even Lord St. Vincent was not altogether successful in administration, though at that time First Lords gave up their whole time to the great department they administered. Later on the Admiralty became more political, and there was some prejudice against a naval officer being its chief. As an example of this, when Lord Melville was First Lord and resigned in 1805, Pitt submitted the name of Admiral Sir Charles Middleton, then Senior Naval Lord, to the King as his successor, and also recommended his being raised to the peerage. George III., in reply, wrote to Pitt, saying: "His Majesty will not object to it, nor to his being advanced to the rank of a Baron, but his attending Cabinet meetings ought to be confined to subjects regarding the Navy." Sir Charles became Lord Barham, and it fell to him a few months later to make those arrangements by which the combined French and Spanish fleets were met by Sir Robert Calder and driven south.

A Second Naval Lord has most of the *personnel* under



Methods of armour-plating Battleships, 1859-1902. The shading indicates the thickness of armour: left to right, 6 in. thick or less; upright, 9 in. to 7 in.; right to left, more than 10 in. thick.

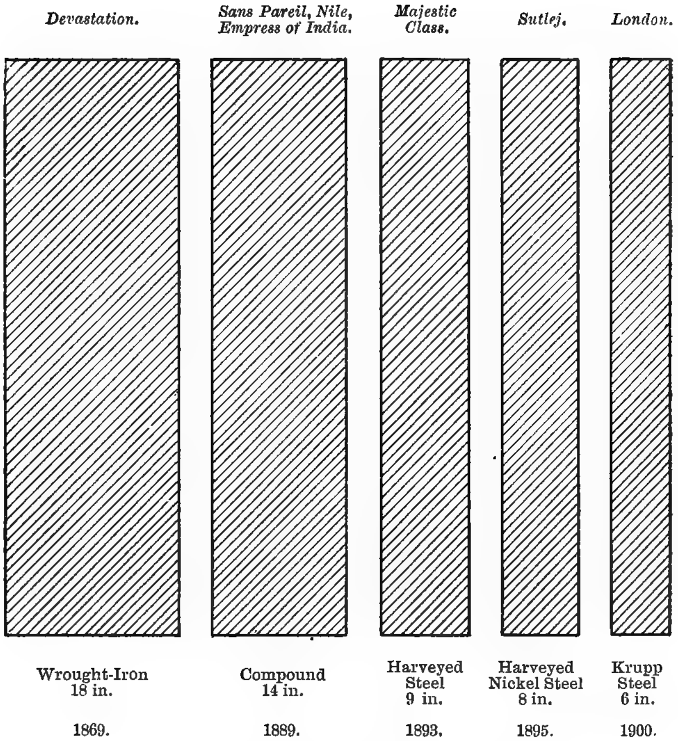


Half sections of Battleship and Protected Cruiser—Cruiser to left, Battleship to right. Showing armour-deck on former and armour-deck and upright armour on latter. Armour, black. Coal, shaded.

DIAGRAM SHOWING METHOD OF ARMOUR-PLATING BATTLESHIPS.

his administration, while a Third Naval Lord, as Controller, has all to do with the construction and equipment of ships. A Junior Naval Lord has the remainder of the *personnel* and other matters to look after. There is a Civil Lord and a Financial Secretary. Collectively they form a Board of the best professional opinion the Navy can furnish, and a system of administration which long experience has proved satisfactory. Those who are averse to bringing the sister service into line with the Admiralty as regards administration say the Board method has not undergone the test of war—a curious reading of history when nearly all the great conflicts of the past at sea took place with a Board at the head of naval affairs. It did not fail during those hundred years of struggle which culminated in Trafalgar and definite naval supremacy. Why should it do so in future wars? Experience seems to demonstrate that great undertakings, whether of a commercial or warlike nature, must be directed by one man or a board. If a Bonaparte is available probably the single direction will produce best results, but failing such a genius a small board with a good chairman seems to offer the best chance of success. A system under which administrative and executive functions are separately allocated to two high authorities is difficult to work, for the chief power must rest with the one who controls the purse strings and is responsible to Parliament for expenditure. We have an instance of the dual system in naval annals, when, in 1406, the administration of the Navy was confided to two merchants, Nicholas Blackburne and Richard Clyderow; but it did not answer, and they were relieved of their functions within a year.

By the patent under which commissioners are appointed for office of Lord High Admiral they have equal authority, an instance of which is observed in the fact that all sign the Navy Estimates submitted to Parliament, which serves also



THE PROGRESS OF ARMOUR, 1869-1900.

The diagram shows equivalent thicknesses of the various kinds of armour in use at the various dates: thus 6 in. of Krupp steel is about equal in resistance to 9 in. of Harveyed and 18 in. of wrought-iron. Names of the ships with various kinds of armour given above.

DIAGRAM SHOWING PROGRESS IN ARMOUR.

to indicate their approval with the amount provided. Custom, however, and an Order in Council issued in 1869, with subsequent modifications, have given the First Lord a position of more distinct personal responsibility to the Sovereign and to Parliament for all the business of the Admiralty. The terms of the patent, however, have not been altered, so that by it the other Lords are also responsible for the standard of naval strength maintained.

In these days it may seem strange that up to comparatively recently there was no special department at the Admiralty for the systematic registration of information concerning foreign navies, or for organising a complete scheme of mobilisation for our own. In the old wars, intelligence of the enemy was uncertain and procured very much at haphazard. It filtered to headquarters through various channels. When the Russian war of 1854 broke out there was a great lack of knowledge in this country of the Crimea and all connected with it. This is clearly indicated in the despatches to Lord Raglan ordering him to attack Sebastopol. After that war some attempt was made to remedy this defect, but in our Navy a Special Intelligence and Mobilisation Department at the Admiralty is only an eighteen-year-old institution. During that period, however, it has culled an immense mass of information from all parts of the world, while the steps for putting our fleet on a war footing have received such continuous attention that we can now reinforce any portion without those delays which such a proceeding formerly invariably entailed.

The three great centres of activity at a time of mobilisation are Portsmouth, Plymouth, and Sheerness, for each has to furnish a squadron from the vessels in reserve at these ports when required. To do this expeditiously each place should be self-contained, that is, not required to draw upon another locality for men or stores. This is now practically accomplished.

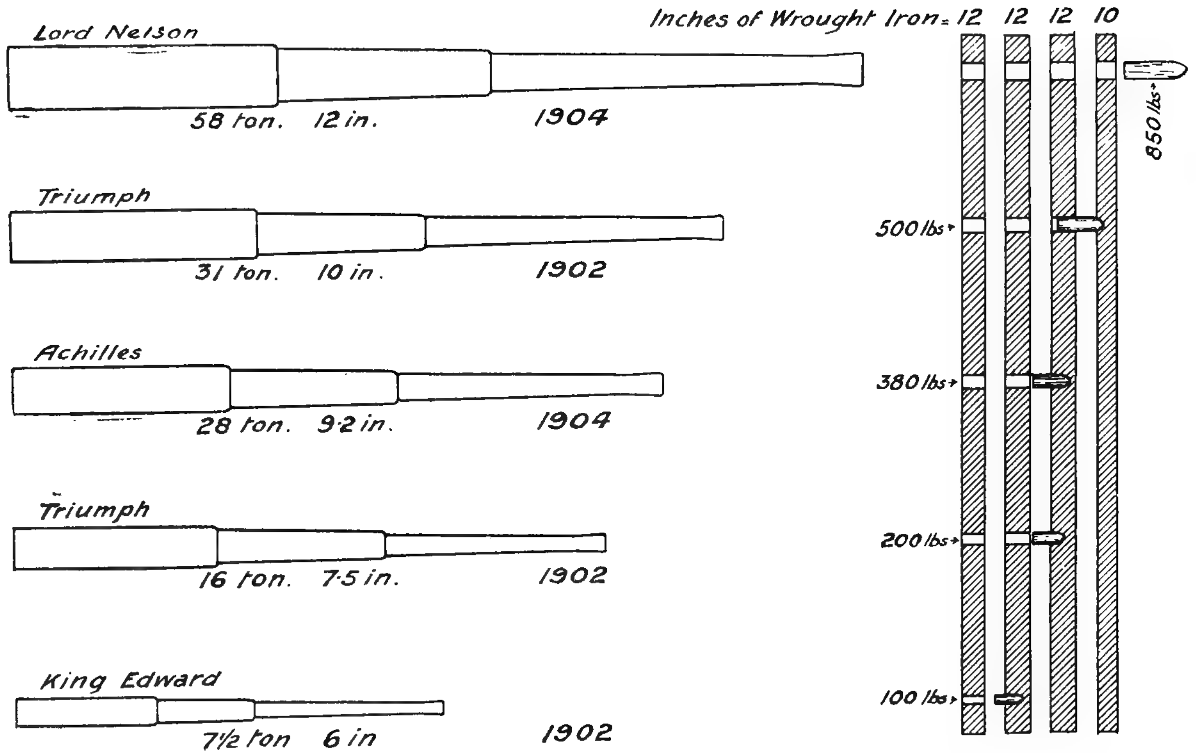


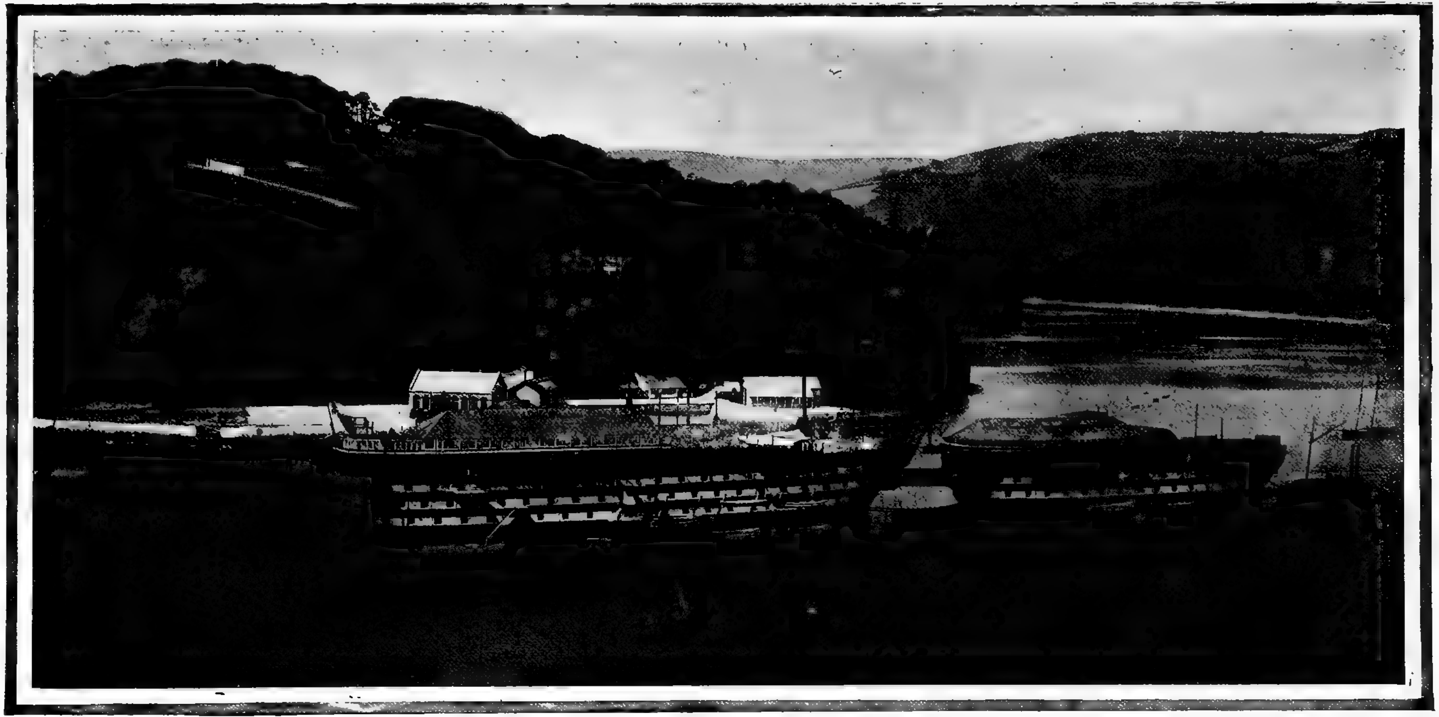
DIAGRAM SHOWING PENETRATIVE POWER OF GUNS.

The work accomplished during the last twelve years towards regaining the position we formerly held as a maritime Power has shown the great resources of this country in shipbuilding, and the clear desire of the nation to maintain our naval supremacy. If these efforts are continued we shall be in a position to meet with confidence any eventuality.

The following lists give the different classes of ships in His Majesty's fleet, with their size, speed, armour, and armament. The Admiralty classification has been followed, and all vessels retained in the *Navy List* are included; though many, owing to age and defective armament, are of little present value.

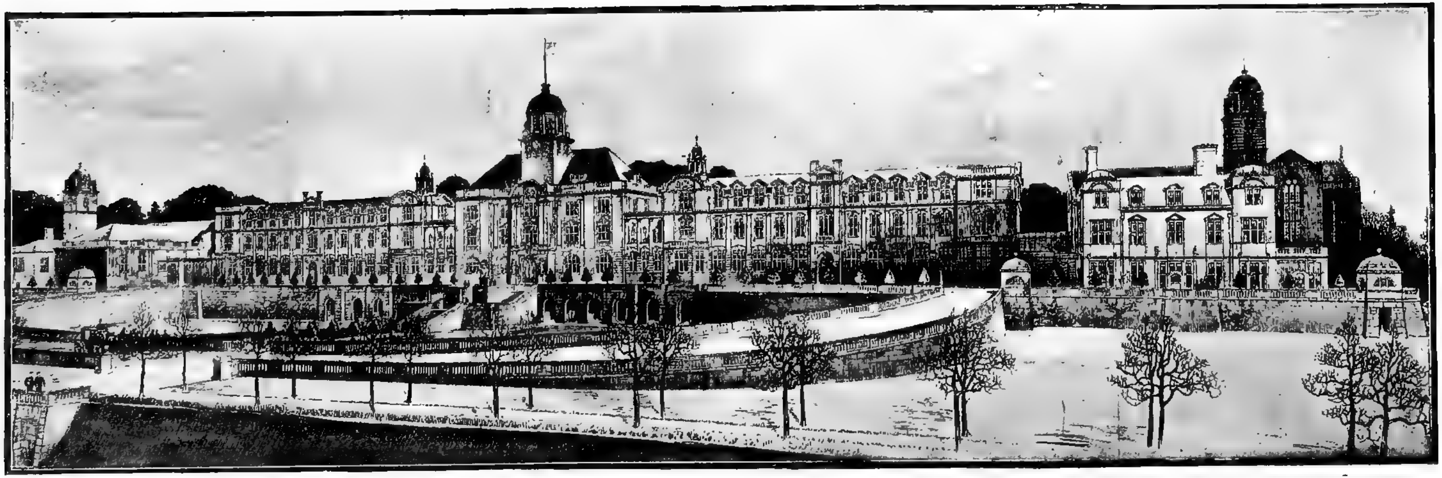
The chief points of the principal guns used are also given in a separate table, while our resources in officers and men for a general mobilisation are briefly indicated.

Such, briefly, is the British Navy at the present time. It is upheld by great traditions and fostered by the instincts of a nation which is beginning to realise how much depends upon maintaining its efficiency. As one who entered that Service more than forty years ago, and has watched its progress with interest and affection, I can testify to the great improvement successive administrations of late years have made, and to the high general standard of efficiency to which that Service has attained.



H.M.S. *BRITANNIA* AND *HINDOSTAN* AT DARTMOUTH. *By kind permission of the "King."*

The site of the New Naval College is on the space occupied by the single tree on the hill at the left of the picture



By kind permission of the "King.

PLAN OF THE NEW NAVAL COLLEGE AT DARTMOUTH.

Photo, Crockett.

APPENDIX.

ABBREVIATIONS.

Armour.—WL, Water-line; BG, Barbette Guns; TG, Turret guns: G, Broadside Guns; D, Deck; S, Steel; HS, hardened Steel; C, Compound; I, Iron; QFG, Quick-fire Guns.

Armament.—ML, Muzzle-loading; QF, Quick-fire; pr, Pounder; T, Torpedo Tube; SQF, Small Quick-firers. Ships building in italics.

BATTLESHIPS.

Year of Launch	Name	Displacement	Speed	Armour	Armament
	First Class	Tons	Knots	Inches	
—	A...	Design	not	settled	
—	B...				
1903	*King Edward VII.*	16,350	18½	9 WL HS 12 BG HS 6 QFG HS 2 D S	4 12-in. 4 9·2-in. 10 6-in. QF 14 12-pr. QF 6 SQF, 4 T
1903	*Commonwealth* ...				
1903	*Dominion*				
1904	*New Zealand* ...				
1903	*Hindustan*				
—	*Britannia*				
—	*Hibernia*				
—	*Africa*				
1898	Formidable ...	15,000	18	9 WL HS 14 BG HS 6 QFG HS 4-2 D S	4 12-in. 12 6-in. QF 18 12-pr. QF 8 SQF, 4 T
1899	Implacable ...				
1898	Irresistible... ...				
1899	Venerable				
1899	Bulwark				
1899	London				
1902	Queen				
1902	Prince of Wales...				
1895	Majestic	14,900	17½	9 WL HS 14 BG HS 6 QFG HS 4-2 D S	4 12-in. 12 6-in. QF 18 12-pr. QF 14 SQF, 5 T
1894	Magnificent ...				
1896	Cæsar...				
1896	Hannibal				
1896	Illustrious... ...				
1895	Jupiter				
1896	Mars				
1895	Prince George ...				
1895	Victorious				

Year of Launch	Name	Displacement	Speed	Armour	Armament
	First Class (*continued*)	Tons	Knots	Inches	
1891	Royal Sovereign..	14,150	17	18 WL C 17 BG C 5 QFG S 3 D S	4 13·5-in. 10 6-in. QF 30 SQF, 3 T
1892	Royal Oak... ...				
1892	Revenge				
1892	Resolution... ...				
1892	Repulse				
1892	Ramillies				
1891	Empress of India				
1891	*Hood...				
1901	Duncan	14,000	18½	7 WL HS 11 BG HS 6 QFG S 3·2 D S	4 12-in. 12 6-in. QF 12 12-pr. QF 8 SQF, 4 T
1901	Cornwallis... ...				
1901	Exmouth				
1901	Russell				
1901	Albemarle				
1901	Montagu				
1898	Ocean	12,950	18	6 WL HS 12 BG HS 6 QFG S 3·2 D S	4 12-in. 12 6-in. QF 12 12-pr. QF 8 SQF, 4 T
1898	Goliath				
1898	Albion				
1897	Canopus				
1899	Glory...				
1899	Vengeance... ...				
1895	Renown	12,350	18	8 WL HS 10 BG HS 6 QFG 3·2 D	4 10-in. 10 6-in. QF 14 12-pr. QF 10 SQF, 5 T
1888	Nile	11,940	16½	20 WL C 18 TG C 6·3 D S	4 13·5 in. 6 6-in. QF 22 SQF, 3 T
1887	Trafalgar				
1903	†Triumph	11,800	19	7 WL HS 10 BG HS 7 QFG HS 3 D S	4 10-in. 14 7·5-in. QF 14 14-pr. QF 12 SQF, 2 T
1903	†Swiftsure				
1892	Centurion	10,500	18	12 WL C 9 BG C 2 D S	4 10 in. 10 6-in. QF 22 SQF, 3 T
1892	Barfleur				
1887	Sans Pareil ...	10,470	17	18 WL C 18 TG C 6·3 D S	2 16·25-in. 1 10-in. 12 6-in. QF 32 SQF, 3 T
1885	Benbow	10,600	16	18 WL C 14 BG C 3·2 D S	2 16·25-in. 10 6-in. QF 29 SQF, 3 T
1886	Anson	10,600	16	18 WL C 12 BG C 3·2 D S	4 13·5-in. 6 6-in. QF 28 SQF, 2 T
1885	Camperdown ...	10,600			
1885	Howe...	10,300			
1884	Rodney	10,300			
1882	Collingwood ...	9,500	16	18 WL C 12 BG C 2½ D S	4 12-in. 6 6-in. QF 22 SQF, 2 T
	Total ... 61				

* The four heavy guns of the *Hood* are in turrets.

† Purchased from Chilian Government.

Year of Launch	Name	Displacement	Speed	Armour	Armament
	SECOND CLASS	Tons	Knots	Inches	
1882	Colossus	9,420	14	18 WL C 16 TG C 3-2½ D S	4 12-in. 5 6-in. QF 17 SQF, 2 T
1882	Edinburgh... ...				
1871	Devastation ...	9,330	14	12 WL I 14 TG I 3-2 D S	4 10-in. 17 SQF, 2 T
1872	Thunderer... ...				
	Total ... 4				
	THIRD CLASS				
1881	Conqueror	6,200	13	12 WL C 12 TG C 2½-2 D S	2 12-in. 4 6-in. QF 16 SQF, 2 T
1885	Hero				
	Total ... 2				
	COAST DEFENCE				
1872	Rupert	5,440	13	11 WL I 14 TG I	2 9·2-in. 2 6-in. QF 12 SQG, 2 T
1870	Hotspur	4,010	11	11 WL I 10 TG I	2 12-in. ML 2 6-in. 6 12-pr. 10 SQF, 2 T
	Total ... 2				

CRUISERS.

Year of Launch	Name	Displacement	Speed	Armour	Armament
	FIRST CLASS ARMOURED	Tons	Knots	Inches	
1901	Drake...	14,100	23	6 WL HS 6 QFG S 4-2 D S	2 9·2-in. 16 6-in. QF 14 12-pr. 5 SQF, 2 T
1901	King Alfred ...				
1901	Leviathan				
1901	Good Hope ...				
—	C, D, E, F... ...	Design	not settled.		
—	*Duke of Edinburgh*	13,550	22	6 WL HS 6 BG HS 6 QFG HS 2 D S	6 9·2 in. 10 6-in. QF 30 SQF, 2 T
—	*Black Prince* ...				
—	*Warrior*				6 9·2 in. 4 7·5 in. 30 SQF, 2 T
—	*Achilles*				
—	*Natal*...				
—	*Cochrane*				
1899	Cressy	12,000	21	6 WL HS 6 G S 3-2 D S	2 9·2-in. 12 6-in. QF 19 SQF, 2 T
1900	Hogue				
1900	Aboukir				
1899	Sutlej				
1901	Bacchante... ...				
1901	Euryalus				

Year of Launch	Name	Displacement	Speed	Armour	Armament
	FIRST CLASS ARMOURED (*continued*)	Tons	Knots	Inches	
1903	*Devonshire*	10,850	22	6 WL HS 6 BG HS 6 QFG HS 2 D S	4 7·5-in. 6 6-in. QF 27 SQF, 2 T
1903	*Hampshire*				
1903	*Argyll*				
1903	*Roxburgh*				
1903	*Antrim*				
1903	*Carnarvon*				
1901	Monmouth ...	9,800	23	4 WL HS 4 QFG S 4-2 D S	14 6-in. QF 10 12-pr. 5 SQF, 2 T
1901	Kent				
1901	Bedford				
1901	Essex...				
1903	Berwick				
1903	Cornwall				
1902	Lancaster				
1903	Suffolk				
1903	Donegal				
1903	Cumberland ...				
1883	Impérieuse ...	8,400	17	10 WL C 4½ G S 4-2 D S	4 9·2-in. 10 6-in. QF 18 SQF, 2 T
1884	Warspite				
1887	Aurora	5,600	18	10 WL C 4½ G 3-2 D S	2 9·2-in. 10 6-in. QF 18 SQF, 2 T
1886	Australia				
1887	Galatea				
1887	Immortalité ...				
1886	Narcissus				
1886	Orlando				
1886	Undaunted ...				
	Total ... 45				
	FIRST CLASS PROTECTED				
1895	Powerful	14,200	22	6 G S 6-3 D S	2 9·2-in. 16 6-in. QF 16 12-pr. QF 14 SQF, 4 T
1895	Terrible				
1896	Diadem	11,000	21	4½ G S 6-3 D S	16 6-in. QF 14 12-pr. QF 5 SQF, 2 T
1897	Andromeda ...				
1897	Europa				
1897	Niobe...				
1898	Amphitrite ...				
1898	Argonaut				
1898	Ariadne				
1898	Spartiate				
1889	Blake...	9,000	21	6 G S 6-3 D S	2 9·2-in. 10 6-in. QF 20 SQF, 2 T
1890	Blenheim				
1892	Crescent	7,700	20	6 G S 5-2 D S	1 9·2-in. 12 6-in. QF 20 SQF, 2 T
1891	Royal Arthur ...				

Year of Launch	Name	Displacement	Speed	Armour	Armament
	FIRST CLASS PROTECTED *(continued)*	Tons	Knots	Inches	
1890	Edgar	7,350	20	6 G S 5-2 D S	2 9·2-in. 10 6-in. QF 21 SQF, 2 T
1891	Endymion				
1892	Grafton				
1891	Hawke				
1892	Theseus				
1892	Gibraltar	7,700	20		
1892	St. George				
	Total ... 21				
	SECOND CLASS PROTECTED				
1903	Challenger	5,880	20½	4 G S 3-2 D S	11 6-in. QF 9 12-pr. QF 8 SQF, 2 T
1903	Encounter				
1896	Arrogant	5,750	20	4 G S 2-1 D S	10 6-in. QF 9 12-pr. QF 5 SQF, 2 T
1896	Furious	5,750	20	4 G S 2-1 D S	4 6-in. QF 6 4·7-in. QF 9 12-pr. QF 5 SQF, 2 T
1897	Vindictive				
1896	Gladiator				
1898	Hermes	5,600	20	4 G S 3-2 D S	11 6-in. QF 9 12-pr. 18 SQF 2 T
1898	Highflyer				
1898	Hyacinth				
1896	Dido	5,600	20	4 G S 3-2 D S	11 6-in. QF 9 12-pr. 8 SQF 3 T
1896	Doris				
1896	Isis				
1895	Juno				
1895	Venus				
1895	Diana	5,600	20	4 G S 3-2 D S	5 6-in. QF 6 4·7-in. QF 9 12-pr. 8 SQF, 3 T
1894	Eclipse				
1895	Minerva				
1895	Talbot				
1893	Astræa	4,360	20	4 G S 2-1 D S	2 6-in. QF 8 4·7 QF 14 SQF 3 T
1892	Bonaventure				
1893	Cambrian				
1893	Charybdis				
1893	Flora				
1893	Forte				
1893	Fox				
1893	Hermione				
1883	Amphion	4,300	17	1½ D S	10 6-in. QF 14 SQF, 2 T
1882	Arethusa				
1885	Mersey	4,050	17	4 G S 3-2 D S	2 8-in. 10 6-in. QF 15 SQF, 2 T
1885	Severn				
1886	Forth				
1885	Thames				

Year of Launch	Name	Displacement	Speed	Armour	Armament
	SECOND CLASS PROTECTED (*continued*)	Tons	Knots	Inches	
1891	Æolus	3,600	20	4 G S 2-1 D S	2 6-in. QF 6 4·7-in. QF 14 SQF 3 T
1891	Brilliant				
1891	Intrepid				
1891	Iphigenia				
1890	Pique				
1891	Rainbow				
1891	Retribution ...				
1890	Sirius				
1891	Spartan				
1891	Indefatigable ...				
1890	Andromache ...	3,400	20	4 G S 2-1 D S	2 6-in. QF 6 4·7-in. QF 13 SQF 3 T
1891	Apollo				
1890	Latona				
1890	Melampus				
1890	Naiad				
1891	Sappho				
1891	Scylla				
1890	Terpsichore ...				
1890	Thetis				
1891	Tribune				
	Total ... 52				
	THIRD CLASS				
—	*Amethyst*	3,000	21½	...	12 4-in. QF 11 SQF, 2 T
—	*Topaze*				
—	*Diamond*				
—	*Sapphire*				
1888	Magicienne ...	2,950	19	1½ D S	6 6-in. QF 13 SQF, 3 T
1888	Marathon				
1888	Melpomene ...				
1888	Medea	2,800	19	1½ D S	6 6-in. QF 13 SQF, 3 T
1888	Medusa				
1890	Pallas	2,575	19	4 G 2-1 D S	8 4·7-in. QF 12 SQF, 3 T
1890	Pearl				
1890	Philomel				
1890	Phœbe				
1889	Katoomba				
1889	Mildura				
1889	Ringarooma ...				
1889	Tauranga				
1890	Wallaroo				
1896	Pelorus	2,135	20	4 G S 2 D S	8 4-in. QF 11 SQF, 2 T
1900	Pandora				
1896	Proserpine ...				
1896	Pactolus				
1897	Pegasus				
1897	Perseus				
1899	Pioneer				
1897	Pomone				
1898	Prometheus ...				
1898	Psyche				
1897	Pyramus				

Year of Launch	Name	Displacement	Speed	Armour	Armament
	THIRD CLASS (*continued*)	Tons	Knots	Inches	
1889	Barham	1,830	17	4 G S 2-1 D S	6 4·7-in. QF 6 SQF, 2 T
1890	Bellona				
1889	Barracouta ...	1,580	17	4 G S 2-1 D S	6 4·7-in. QF 6 SQF, 2 T
1889	Barrosa				
1889	Blanche				
1889	Blonde				
	UNPROTECTED:				
1877	Iris	3,730	18	...	13 5-in. 2 SQF, 2 T
1878	Mercury		16	...	
1886	Brisk	1,770	16	...	6 6-in. QF 10 SQF, 2 T
1886	Cossack				
1886	Mohawk				
1886	Porpoise				
1887	Racoon				
1886	Tartar				
1885	Archer				
1886	Fearless	1,580	16	...	4 4·7-in.QF, 10 SQF, [4 T
1884	Pylades	1,420	13	4 G S 1¼ D S	14 5-in., 8 SQF
	Total ... 46				

SCOUTS.

Year of Launch	Name	Displacement	Speed	Armour	Armament
		Tons *	Knots	Inches	
—	*Sentinel*	2,900	25		10 12-pr. QF
—	*Forward*	2,545			
—	*Adventure*	2,750			
—	*Pathfinder*	2,610			
—	*Attentive*	2,600 to 2,900			
—	*Skirmisher*				
—	*Foresight*				
—	*Patrol*				
	Total ... 8				

* Estimated by contractors.

SPECIAL SERVICE VESSELS.

	Name	Displacement	Speed	Armour	Armament
		Tons	Knots	Inches	
Repair	Assistance	9,600	12		
Torpedo Depôt	Vulcan	6,620	20	4 G 5-2 D S	8 4·7-in. QF 24 SQF, 6 T
	Hecla...	6,400	13	...	4 6-in. ML 1 5-in., 4 T

SLOOPS, GUN VESSELS, AND DESPATCH VESSELS.

Armament	Displacement	Speed	Name		
	Tons	Knots			
8 5-in. to 6 4-in. QF	1,170 to 950	14 to 12	Nymphe	Rinaldo	Daphne
			Phœnix	Merlin	Algerine
			Icarus	Swallow	Mutine
			Torch	Alert	Swallow
			Odin	Melita	Espiègle
			Beagle	Fantome	Cadmus
			Clio	Shearwater	
			Rosario	Vestal	
		Total	... ... 22.		
6 4-in. QF to 2 4-in. QF	950 to 710	14 to 12	Curlew	Linnet	Pigmy
			Redbreast	Pigeon	Dwarf
			Swift	Britomart	Magpie
			Pheasant	Lizard	Thrush
			Bramble	Lapwing	Peacock
			Thistle	Ringdove	Plover
			Goldfinch	Partridge	Rattler
			Redpole	Landrail	
		Total	... ... 23.		
4 5-in.	1,650	17	Surprise	Alacrity	

TORPEDO GUNBOATS.

Armament	Displacement	Speed	Name		
	Tons	Knots			
2 4·7-in. QF 5 SQF 4 to 5 T	1,070	19	Dryad	Halcyon	Harrier
			Hazard	Hussar	
	810	19	Alarm	Jason	Speedy
			Jaseur	Renard	Hebe
			Onyx	Circe	Niger
			Antelope	Leda	
	735	20	Seagull	Spanker	Plassey
			Skipjack	Assaye	Sheldrake
			Gossamer	Sharpshooter	Gleaner
			Boomerang	Speedwell	Karakatta
			Salamander		
	525	19	Sandfly	Grasshopper	
		Total	... ... 31.		

TORPEDO BOAT DESTROYERS.

Speed	Name	Date of Launch or Floating	Displacement	Armament
Knots			Tons	
29 to 31	Success	1901	380	1 12-pr. QF 5 smaller QF 2 T
	Arab	1901	470	
	Roebuck	1901	385	
	Greyhound	1900		
	Racehorse	1900		
	Stag	1900	320	
	Thorn	1900	380	
	Tiger	1900		
	Vigilant	1900		
	Ostrich	1900	375	
	Lively	1900	385	
	Sprightly	1900		
	Vixen	1900	400	
	Myrmidon	1900	370	
	Syren	1900	390	
	Kangaroo	1900	370	
	Peterel	1899	370	
	Spiteful	1899	365	
	Lee	1899		
	Falcon	1899	375	
	Leven	1898	370	
	Orwell	1898	360	
	Taku	1898	305	6 light QF 3 T
	Albatross	1898	430	1 12-pr. QF 5 smaller QF 2 T
	Cygnet	1898	335	
	Cynthia	1898		
	Bullfinch	1898	345	
	Dove	1898		
	Vulture	1898		
	Kestrel	1898	350	
	Mermaid	1898	355	
29 to 30	Cheerful	1897	355	1 12-pr. QF 5 smaller QF 2 T
	Sylvia	1897	350	
	Violet	1897		
	Coquette	1897	335	
	Angler	1897	310	
	Ariel	1897		
	Fairy	1897	355	
	Gipsy	1897		
	Osprey	1897		
	Express	1897	465	
	Panther	1897	355	
	Seal	1897		
	Wolf	1897		
	Bittern	1897		
	Leopard	1897	350	

Speed	Name	Date of Launch or Floating	Displacement	Armament
Knots			Tons	
29 to 30—(*continued*)	Fawn	1897	360	1 12-pr. QF 5 smaller QF 2 T
	Flirt	1897		
	Flying Fish	1897		
	Bat	1896		
	Chamois	1896		
	Crane	1896		
	Star	1896		
	Whiting	1896		
	Avon	1896	355	
	Otter	1896	350	
	Brazen	1896	345	
	Electra	1896	350	
	Recruit	1896		
	Desperate	1896	310	
	Fame	1896		
	Foam	1896		
	Mallard	1896		
	Locust	1896	355	
	Earnest	1896		
27 to 30	Griffon	1896	355	1 12-pr. QF 5 smaller QF 2 T
	Quail	1895		
	Sparrowhawk	1895		
	Thrasher	1895		
	Virago	1895		
	Sunfish	1895	295	1 12-pr. QF 5 smaller QF 1 T
	Opossum	1895		
	Ranger	1895		
	Zebra	1895	310	
	Handy	1895	275	
	Hart	1895		
	Hunter	1895		
	Starfish	1895	265	
	Skate	1895		
	Swordfish	1895	295	
	Spitfire	1895		
	Salmon	1895	305	
	Snapper	1895		
	Janus	1895	275	
	Lightning	1895		
	Porcupine	1895		
	Teazer	1895	320	
	Wizard	1895		
	Hardy	1895	260	
	Haughty	1895		
	Fervent	1895	275	
	Zephyr	1895		
	Bruizer	1895	265	
	Banshee	1894	290	
	Contest	1894		
	Dragon	1894		
	Lynx	1894	280	1 12 pr. QF 3 smaller QF 1 T
	Sturgeon	1894	265	1 12 pr. QF 5 smaller QF 1 T

Speed	Name	Date of Launch or Floating	Displacement	Armament
Knots			Tons	
26 to 28	Conflict	1894	320	1 12-pr. QF 5 smaller QF 1 T
	Rocket	1894	280	
	Shark	1894		
	Surly	1894		
	Ardent	1894	265	
	Boxer	1894		
	Decoy	1894	260	1 12-pr. QF 3 smaller QF 1 T
	Charger	1894	270	1 12-pr. QF 5 smaller QF 1 T
	Dasher	1894	255	
	Hasty	1894	270	
	Ferret	1893	280	1 12-pr. QF 3 smaller QF 1 T
	Havock	1893	240	
	Hornet	1893		
	Daring	1893	260	
	Building:			
25½ to 27	Velox	1902	400	1 12-pr. QF 5 smaller QF 2 T
	Derwent	—	500 (*e*)	
	Eden	—		
	Erne	—	515 (*e*)	
	Ettrick	—		
	Exe	—		
	Foyle	—	525 (*e*)	
	Itchen	—		
	Ribble	—	520 (*e*)	
	Teviot	—		
	Usk	—		
	Arun	—	525 (*e*)	
	Blackwater	—		
	Cherwell	—	515 (*e*)	
	Dee	—		
	Kennet	—	510 (*e*)	
	Jed	—		
	Welland	—	520 (*e*)	
	Waveney	—	500 (*e*)	
	Chelmer	—	—	1 12-pr. QF, 5 SQ
	Colne	—	—	
	Gala	—	—	
	Garry	—	—	
	Liffey	—	—	
	Moy	—	—	
	Ouse	—	—	
	Boyne	—	—	
	Doon	—	—	
	Kale	—	—	
	Swale	—	—	
	Ure	—	—	
	Wear	—	—	
	16 others projected	—	—	
	Total 160			

(*e*) Estimated.

TORPEDO BOATS.

Length	No.	Date of Launch	Displacement	Armament
BUILT			Tons	
165 ft.	4	1902	194	3 3-pr. QF 3 T
160 ft.	4	1901 and 1902	180	3 3-pr. QF 3 T
131 to 153 ft.	15	1885 to 1896	90 to 150	3 3-pr. QF (one has 4). 3 T
100 to 130 ft.	62	1885 to 1889	63 to 100	1 3-pr. QF and 2 machine guns (six have 3 3-pr. QF and no machine guns, and two have no guns). 2 or 3 T
BUILDING				
165 ft.	1	1903	194	3 3-pr. QF 3 T
165 ft.	4	—	194	3 3-pr. QF 3 T

SUBMARINE BOATS.

Name	Date of Launch	Displacement	Armament
BUILT		Tons	
No. 1	1901	120	1 T
No. 2	1902		
No. 3	1902		
No. 4	1902		
No. 5	1902		
BUILDING			
No. A. 1	1902	200	1 T
No. A. 2	1903	200	2 T
No. A. 3	—		
No. A. 4	—		
Twenty others building and projected	—	—	—
Total 29			

SEA SERVICE BL ORDNANCE.

DETAILS OF GUNS.

Calibre	Weight		Length of bore in Calibres	Weight of Projectile	Muzzle Velocity	Penetration of wrought iron at 1000 yards
	Tons	Cwt.	No.	Lbs.	Ft. per sec.	Inches
16·25-in.	111	0	30	1,800	2,080	30
13·5-in.	67	0	30	1,250	2,020	28
12-in. (light)	45	0	25	710	1,900	20
12-in. (heavy)	50	0	40	850	2,450	34
10-in.	29	0	32	500	2,020	20
9·2-in. (early)	22	0	25	380	1,800	16
9·2-in. (later)	27	0	45	380	2,600	27
8-in.	14	0	25	210	1,900	13
7·5-in.	14	0	45	200	2,700	25
6-in. QF	7	0	40	100	2,150	11
6-in.	7	0	45	100	2,500	14
5-in. QF	2	0	25	50	1,750	6
4·7-in. QF	2	2	40	45	2,100	6
4-in. QF	1	6	40	25	2,200	6
12-pr. QF	0	12	40	12	2,200	5
6-pr. QF	0	8	40	6	1,800	2½
3-pr. QF	0	5	40	3	1,800	2

Nearly all the above guns have cordite charges.

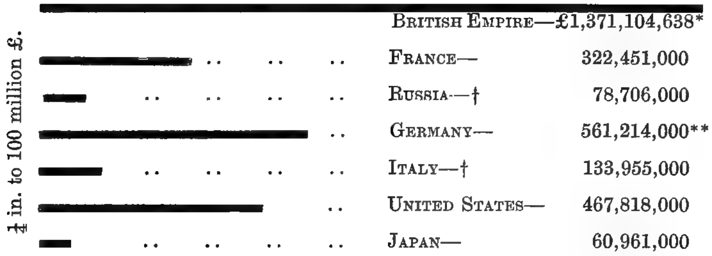
Guns are designated Q.F. which have their charges in brass cartridge cases.

There are two sizes of Whitehead torpedo used in the naval service: the smallest, of 14 in. diameter, has a charge of 80 lbs. of guncotton and a speed of twenty-eight knots for 1,000 yards; the larger one has a diameter of eighteen inches, and carries a charge of 200 lbs. of guncotton—it will travel 1,000 yards at the rate of thirty-one knots an hour. The motive power is compressed air, working in a special engine and actuating a pair of propellers revolving in opposite directions. There are vertical and horizontal rudders to keep the torpedo on a straight course and at a uniform depth. In the nose, at extremity of the head, is a percussion firing arrangement for igniting the charge on striking an object.

NAVIES AND COMMERCE, 1902.

(Compiled from Parliamentary Return No. 284, of July 29, 1903.)

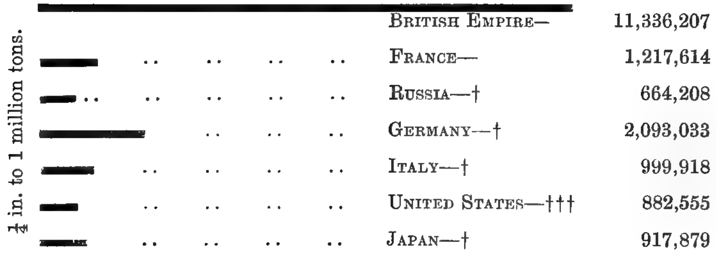
ANNUAL VALUE OF SEABORNE COMMERCE.



BRITISH EMPIRE—	£1,371,104,638*
FRANCE—	322,451,000
RUSSIA—†	78,706,000
GERMANY—	561,214,000**
ITALY—†	133,955,000
UNITED STATES—	467,818,000
JAPAN—	60,961,000

Most of the Foreign Commerce above given is carried in British ships.

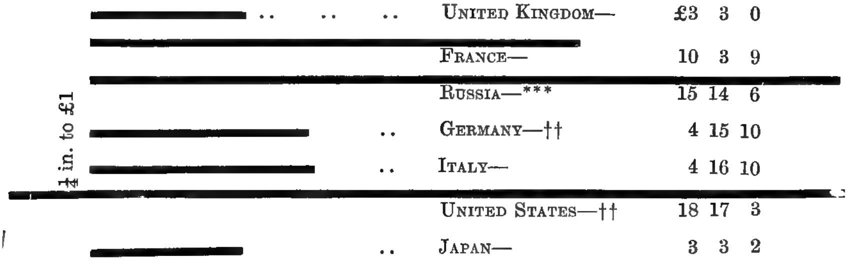
MERCANTILE MARINE TONNAGE.



BRITISH EMPIRE—	11,336,207
FRANCE—	1,217,614
RUSSIA—†	664,208
GERMANY—†	2,093,033
ITALY—†	999,918
UNITED STATES—†††	882,555
JAPAN—†	917,879

NAVAL EXPENDITURE PER TON OF SHIPPING.

(OR RATE OF INSURANCE.)



UNITED KINGDOM—	£3	3	0
FRANCE—	10	3	9
RUSSIA—***	15	14	6
GERMANY—††	4	15	10
ITALY—	4	16	10
UNITED STATES—††	18	17	3
JAPAN—	3	3	2

The Total Ocean or Seaborne Commerce of the FOUR European Powers above named is as 79 only to 100 of British Commerce; their Shipping or Mercantile Marine Tonnage is as 45 only to 100 of British; while their Naval Expenditure is as 106 to 100 of ours; and the average of their Naval Expenditure per ton of Shipping owned by them is as 354 to 100 of British Expenditure on Navy as compared with our Shipping.

---

* This includes all Canadian trade, sea imports and exports not shown separately, including also bullion and specie.

** Total trade sea imports and exports not distinguished.

*** In addition to the ordinary estimates a sum of £11,500,000, allotted in 1897 and 1898, is being spent on Naval expansion.

† 1901. †† 1903—including cost of Naval Forts (Germany alone).

††† Foreign trade only.

NAVAL STRENGTH.

"*It is on the British Navy, under the good Providence of God, the Wealth, Safety and Strength of the Kingdom chiefly depend.*"—ARTICLES OF WAR.

Opinions of Statesmen and Experts.

MR. COBDEN: "I would vote a hundred million pounds rather than allow the French navy to be increased to a level with ours, because I should say that any attempt of that sort, without any legitimate grounds, would argue some sinister designs upon this country."—*Rochdale, June* 26, 1861.

LORD TENNYSON: "The fleet of England is her all in all."—1884.

MR. JOHN MORLEY, M.P.: "Everybody knows, Liberals as well as Tories, that it is indispensable that we should have not only a powerful Navy, but I may say an all-powerful Navy."—*Manchester, November* 8, 1893.

ADMIRAL P. H. COLOMB: "Keep the command of the sea as you value national life. With it you can do everything. Without it you will be speedily blotted out of the list of nations."—1898.

MR. H. H. ASQUITH, M.P.: "The moment we lose command of the sea this country will be at the mercy of the enemy."—*Leven, October* 7, 1902.

ADMIRAL SIR JOHN FISHER, G.C.B.: "We require fearless, vigorous, and progressive administration, open to any reform, never resting on its oars—for to stop is to go back—and forecasting every eventuality."—*May* 2, 1903.

THE EARL OF SELBORNE: "The Navy means for you your existence as an empire; it means for you the fact that you are free from invasion; it means for you your daily food and daily employment.

"The Navy is all in all and everything; therefore, though the cost is great, it is little compared with what it brings back to you."—*February* 26, 1904.

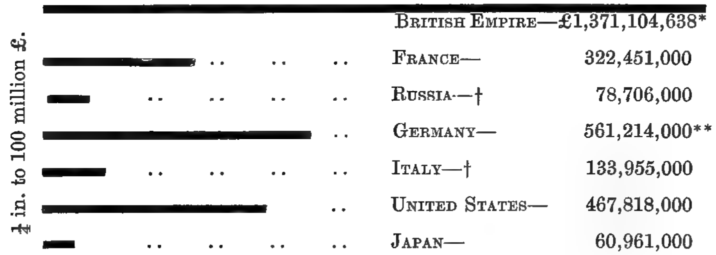
CAPTAIN MAHAN, U.S.N.: "The British fleet should be strong, because it guarantees the peace of the world."

VISCOUNT WOLSELEY: "We are never ready for war, and yet we never have a Cabinet that would dare to tell the people this truth."

NAVIES AND COMMERCE, 1902.

(Compiled from Parliamentary Return No. 284, of July 29, 1903.)

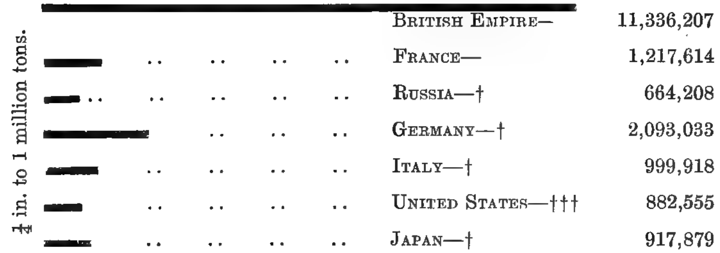
ANNUAL VALUE OF SEABORNE COMMERCE.



BRITISH EMPIRE—	£1,371,104,638*
FRANCE—	322,451,000
RUSSIA—†	78,706,000
GERMANY—	561,214,000**
ITALY—†	133,955,000
UNITED STATES—	467,818,000
JAPAN—	60,961,000

Most of the Foreign Commerce above given is carried in British ships.

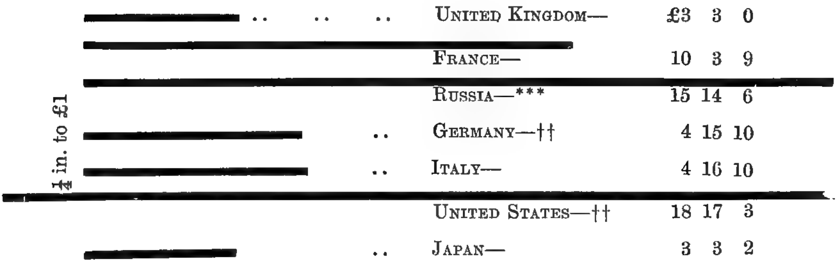
MERCANTILE MARINE TONNAGE.



BRITISH EMPIRE—	11,336,207
FRANCE—	1,217,614
RUSSIA—†	664,208
GERMANY—†	2,093,033
ITALY—†	999,918
UNITED STATES—†††	882,555
JAPAN—†	917,879

NAVAL EXPENDITURE PER TON OF SHIPPING.

(OR RATE OF INSURANCE.)



UNITED KINGDOM—	£3	3	0
FRANCE—	10	3	9
RUSSIA—***	15	14	6
GERMANY—††	4	15	10
ITALY—	4	16	10
UNITED STATES—††	18	17	3
JAPAN—	3	3	2

The Total Ocean or Seaborne Commerce of the FOUR European Powers above named is as 79 only to 100 of British Commerce; their Shipping or Mercantile Marine Tonnage is as 45 only to 100 of British; while their Naval Expenditure is as 106 to 100 of ours; and the average of their Naval Expenditure per ton of Shipping owned by them is as 354 to 100 of British Expenditure on Navy as compared with our Shipping.

---

* This includes all Canadian trade, sea imports and exports not shown separately, including also bullion and specie.

** Total trade sea imports and exports not distinguished.

*** In addition to the ordinary estimates a sum of £11,500,000, allotted in 1897 and 1898, is being spent on Naval expansion.

† 1901. †† 1903—including cost of Naval Forts (Germany alone).

††† Foreign trade only.

NAVAL STRENGTH.

"It is on the British Navy, under the good Providence of God, the Wealth, Safety and Strength of the Kingdom chiefly depend."—ARTICLES OF WAR.

◆

Opinions of Statesmen and Experts.

MR. COBDEN: "I would vote a hundred million pounds rather than allow the French navy to be increased to a level with ours, because I should say that any attempt of that sort, without any legitimate grounds, would argue some sinister designs upon this country."—*Rochdale, June* 26, 1861.

LORD TENNYSON: "The fleet of England is her all in all."—1884.

MR. JOHN MORLEY, M.P.: "Everybody knows, Liberals as well as Tories, that it is indispensable that we should have not only a powerful Navy, but I may say an all-powerful Navy."—*Manchester, November* 8, 1893.

ADMIRAL P. H. COLOMB: "Keep the command of the sea as you value national life. With it you can do everything. Without it you will be speedily blotted out of the list of nations."—1898.

MR. H. H. ASQUITH, M.P.: "The moment we lose command of the sea this country will be at the mercy of the enemy."—*Leven, October* 7, 1902.

ADMIRAL SIR JOHN FISHER, G.C.B.: "We require fearless, vigorous, and progressive administration, open to any reform, never resting on its oars—for to stop is to go back—and forecasting every eventuality."—*May* 2, 1903.

THE EARL OF SELBORNE: "The Navy means for you your existence as an empire; it means for you the fact that you are free from invasion; it means for you your daily food and daily employment.

"The Navy is all in all and everything; therefore, though the cost is great, it is little compared with what it brings back to you."—*February* 26, 1904.

CAPTAIN MAHAN, U.S.N.: "The British fleet should be strong, because it guarantees the peace of the world."

VISCOUNT WOLSELEY: "We are never ready for war, and yet we never have a Cabinet that would dare to tell the people this truth."

LONDON

PRINTED BY SPOTTISWOODE AND CO., LTD.

54 GRACECHURCH STREET, E.C.

THE OBJECTS OF THE NAVY LEAGUE.

By a Friend.

First.—To bring home to every man, woman and child in the United Kingdom, that the bulk of the raw material used in our manufactures, and two-thirds of the food we eat, is transported across the sea. That, if the supply of material and the export of manufactured products is arrested, the wage fund will disappear, so that the purchasing power of the people must prove utterly inadequate to their needs, and the available store of provisions, however increased, will be entirely beyond their means. That, consequently, fortifications and military strength adequate to resist invasion will be powerless to avert national disaster. That the protection of commerce at sea is, therefore, vital to the people of this country, and especially to the working classes. That commerce can be guarded only by a supremely powerful Navy, able to assert and to maintain the command of the sea.

Second.—To convince every tax-payer and every politician, that judicious expenditure upon the Navy is, for the nation, only the ordinary insurance which no sane person grudges in private affairs, applied to risks appalling in their nature and extent.

Third.—To enlist, on national grounds, the support of all classes in maintaining the Fleet at the requisite standard of strength, and to denounce any shortcomings in this respect.

Fourth.—To insist that the question of the Navy lies above and beyond all considerations of party politics, that a sudden development of naval strength is impossible, and that continuity of preparation is the essence of national security, and the only preventive of ruinous and discreditable scares.

Fifth.—Throughout the Empire to explain by lectures, by the dissemination of literature, by meetings, and by private propaganda, how naval supremacy, the heritage handed down by generations of British seamen, has been alike the source of national prosperity and the sure safeguard of the liberties of the people in periods of stress.

Sixth and finally.—By inculcating and strenuously upholding the principles of a great national policy based upon sea power, to bind together the scattered members of the Empire into one great whole, united in interest as in heart, and prepared to maintain intact in territory, and untarnished in honour, the splendid inheritance received from our forefathers.

Interesting Publications.

Third Edition.

THE NAVY LEAGUE
Wall Map of the World

**Illustrating British Naval History and
Dedicated to the Children of the British Empire.**

The Publishers are pleased to announce the completion of the third edition of this important Map. It is much improved in many ways, especially in the matter of colouring. The size—72 in. by 63 in.—gives ample scope for the work to be boldly treated so as to be effective even in a very large room.

PRICES.

On cloth, stained rollers and varnished, **£1 1s.**

On cloth, mahogany rollers, and bound with silk up the sides,
£1 11s. 6d.

On cloth, folded up in four divisions, and in tilted box case,
£1 11s. 6d.

REDUCED FACSIMILE EDITION

For use of pupils or for handy reference. Size, 23 in. by 15 in., in red cloth case.

Price 1s. nett.

Third Edition.

Bound in navy blue cloth, **1s. 6d.**

Published under the auspices of the Navy League.

BRITAIN ON AND BEYOND THE SEA.

By CECIL H. CROFTS, M.A., Assistant Master at Tonbridge School.

This work is an explanatory Handbook to the Navy League Map of the World. It contains as frontispiece a reduced reproduction—size, 21 in. by 15½ in.—of the Wall Map, with all its special features.

The Letterpress contains a sketch of British Naval History, 1588-1882, based on the list of 112 naval events as printed on the Map. The position of each engagement is shown on the Map by a number, and in text the description of the event will be found under the same number, so that any naval engagement can be quickly localised, and its description easily found.

JOHNSTON'S

Wall Atlas of British Empire

Containing Six Maps, each 30 in. by 40 in., mounted on Cloth, in Ornamental Covers, with metal rimming to preserve perfect flatness, securely fastened between two rollers, with suspenders for easel.

Price 21s.

The Maps include South Africa, India, Australia, New Zealand, Canada, and the West Indies, the World showing the British Empire in 1837 and in 1904.

W. & A. K. JOHNSTON, LTD.,
Edina Works, EDINBURGH, and 7 Paternoster Square, LONDON.